



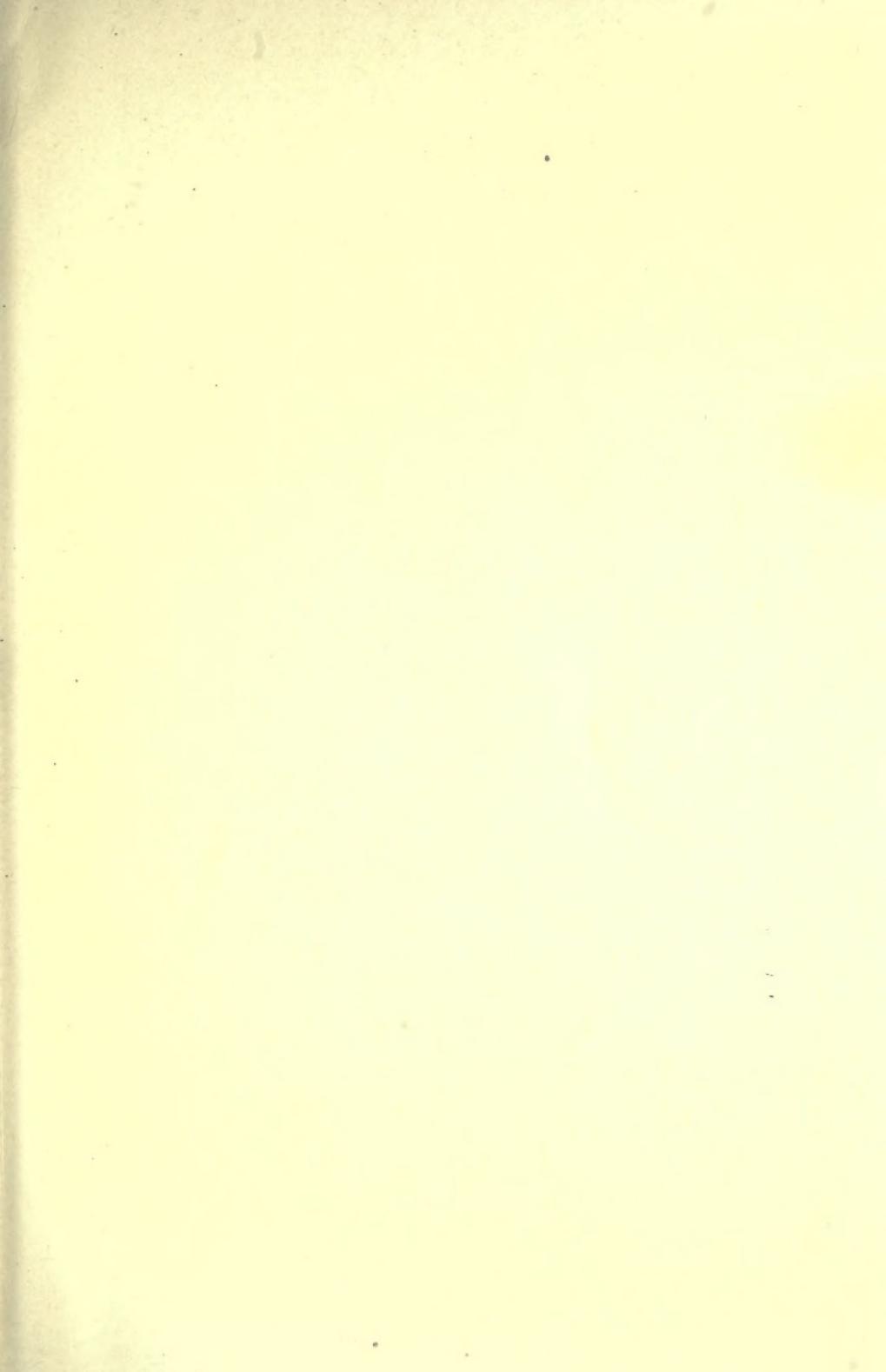
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HEALTHY CHILDREN ARE THE GREATEST WEALTH OF THE NATION

(Photograph by the author.)



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HEALTH EDUCATION IN RURAL SCHOOLS

BY

J. MACE ANDRESS, PH.D.

Head of the Department of Psychology and Child Study, Boston Normal School, formerly Head of the Department of Psychology and Hygiene, State Normal School, Worcester, Mass., one-time member of the County Board of School Examiners, Saginaw County, Mich., author of "The Teaching of Hygiene in the Grades," etc.



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TO MY FOUR CHILDREN
JUDITH, CHARLOTTE, PHILIP
AND RUTH

I'd rather have had something real to do with the acquisition and conservation of a healthier, happier, more productive, and a longer-lived world community of men and women than to have been a victor in the greatest commercial or military battle or the biggest political campaign the world has ever known.

DR. THOMAS A. STOREY

PREFACE

THE winning of the war has long commanded the attention of the American people. Our resources have been spent lavishly to make secure our liberties and the freedom of the world. Such a supreme crisis in our history revealed inspiring patriotism, but also a pathetic weakness in our citizens. Out of 2,510,706 men who were examined on the first draft, a vast army of 730,756 men were rejected on physical grounds. A large proportion of these physical defects might have been corrected or prevented if the schools had been doing their part to train children to conserve and improve their health. Such a serious flaw in public education must challenge the efforts of educators throughout the land. Several States, realizing the gravity of the situation, have recently passed laws making physical education obligatory and requiring a more extensive and practical teaching of hygiene.¹ The war has compelled us to recognize, as we never did before, the fundamental importance of health education as preparedness, not only for military service, but also for happy and efficient participation in civil life.

Contrary to tradition and popular belief, country children have been found to be as defective physically and in many cases more defective than city children. Comparatively little has been done so far for the health of country children.

¹ A bill has been prepared by a committee of the National Committee on Physical Education for the Federal encouragement and promotion of physical education. It provides for an appropriation of \$11,000,000 for the fiscal year ending June 30, 1919. By the year 1923 and thereafter the expenditure provided is \$22,000,000.

Health education in rural schools is restricted largely to getting children to acquire a limited amount of information about health; *almost nothing has been accomplished in actually training children to practice the laws of healthful living.*

This volume is based on the conviction that the *practice of hygiene should be one of the foremost of the aims of the school.* It is intended primarily for the teachers in the rural schools. To this end little attention is given to the theories of hygiene except as knowledge of them seems necessary for practical health training. An attempt is made to point out the most important problems of hygiene and sanitation that confront the average teacher and to suggest how these problems may be met with a fair degree of success. To sum up the purposes of this book, it aims to present clearly and definitely: (1) the reasons why health education is so important; (2) a rather complete discussion of the principles of pedagogy involved; (3) subject-matter on hygiene not usually available in the books accessible to teachers; (4) references to the best literature for teachers and children, particularly that literature which may be secured free or at a nominal price; (5) drawings of hygienic devices which children may be taught to make through the instructions given; and (6) carefully thought-out plans for getting results, not merely in terms of knowledge, but also in training children in habits of personal hygiene, in getting them to improve the sanitation of schoolhouse and grounds, and finally in suggesting how the school may influence rural communities in health matters.

Most of the practical suggestions presented have been tried out successfully by teachers in rural or city schools. They are strongly colored by the experience of the author, who was born in the country, attended the rural schools,

taught in the rural schools, served as a member of a county board of school examiners in the Middle West, and has been a student of country-life problems, particularly health problems, for several years as an instructor in hygiene and child study in normal schools.

While this book contributes little or nothing that is new to the science of hygiene, it does lay claim to a certain amount of originality in at least two ways. It is the first serious and thoroughgoing attempt to treat the subject of health education from the rural teacher's point of view, and to this end it is replete with detailed suggestions as to methods and devices for promoting the health of country children and rural communities. It also represents a pioneer effort to work out a scale of measurement of the teacher's work. (See Chapter XVII.) This scale is crude, but with all its crudity (which cannot well be avoided) it shows briefly the scope of health education in the rural school and the value of different kinds of achievement. If conscientiously applied by rural-school teachers and superintendents it is believed that it will help to work a great improvement in health education in our rural schools.

The class exercises at the end of each chapter are designed primarily for students in normal schools and county training classes, although many of them are directly applicable to teachers in service. They are founded on the principle that the study of rural health problems should be based on first-hand studies of the conditions in rural districts and country schools.

My debt to friends, boards of health, Government bureaus and publishers who have contributed generously to the success of this volume, is so great that detailed recognition of their assistance is impossible. Acknowledgment is

PREFACE

made throughout the text to those who have contributed most in the way of subject-matter and illustrations. I am especially indebted to Dr. L. A. Averill, Editor of the *American Journal of School Hygiene*, who read the manuscript and offered many helpful suggestions, and also to Dr. W. H. Burnham and Arthur W. Kallom who kindly assisted in reading the proof.

J. MACE ANDRESS.

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HEALTH EDUCATION IN RURAL SCHOOLS

CHAPTER I

WHY HEALTH SHOULD BE THE FIRST AIM OF THE SCHOOL

It may well be claimed that the care of individual and family health is the first and most patriotic duty of a citizen.

(Ex-President Taft.)

Necessity of definite aims in education. There are few worthy achievements in life that have been accomplished without conscious purpose. The building of bridges, the digging of canals, the painting of pictures, the writing of books — the numberless results of skillful effort — owe their existence in large measure to clear and definite purposes. What is true of life in general is true of education. The schools may accomplish some things that they little intend, but the experience of our best teachers indicates that the teacher is not likely to be successful in the highest sense of the word unless she has worthy aims. Even then she may not gain the ends sought because she has not found the right methods; nevertheless, the aim is of primary importance. Every teacher who wishes to rank high in her profession should first ask herself what the big aims in education are, and how each subject and influence of the school may help toward the realization of these aims. Let us think for just a moment of these general aims.

General aims in education. If you ask the man in the street why education is valuable, the probability is that he will tell you that it will help a man to earn his living.

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Many opportunities to earn money are open to the man who can read and write and calculate, or who has had some special training, that would never be offered to one illiterate or without unusual education. This bread-and-butter aim is regarded by many people as the most important aim in education.

Happiness is thought by others to be even a greater goal. It is believed by many that education enables one to enjoy a larger world of books, art, and nature that would otherwise be unknown.

Practically all great teachers and writers on education have looked upon morality as one of its foremost aims. Most educators agree that no matter what the fruits of any educational system, it must prove a failure unless it produces moral men and women.

Knowledge for its own sake, often defined as culture, has been from time immemorial a highly prized treasure. Just now, however, it seems to be growing into disfavor.

Within the last few decades we have heard much about education fitting the individual to be useful as a member of society. This broad purpose is being referred to more and more as good citizenship. It is made to include almost every other aim we have mentioned.

Among the numerous aims mentioned by educational writers is health. This we believe to be necessary for the attainment of practically every worthy ambition and achievement. It is the foundation of the realization of all the big aims in education.

Health is necessary in the making of a living. To make one's way in the world, to provide against want, to be to a certain extent financially independent of others, means that one needs to approach his work with a maximum of enthusiasm, skill, and energy. This is impossible unless the individual is at a high standard of physical and mental

efficiency. The worker suffering from disease or some physical defect does an inferior kind of work and less of it than he would if he were in normal health. If his physical disability becomes serious, he is often compelled to give up his work and live on his savings, and, if these prove inadequate, he is reduced to accepting private or public charity and so becomes a burden to society. Perhaps you remember some farmer who was fairly prosperous but fell sick; he was compelled to rent his farm at great economic loss, doctors' bills increased, and eventually he found it necessary to mortgage or sell his farm, and his family was deprived of the necessities of life.

Many industrial concerns, business establishments, and professions are beginning to realize in a practical way the relation of health to efficiency. Some manufacturing establishments make a careful physical examination of their prospective employees to find out whether they have the health necessary to undertake successfully the severe strain that may be imposed upon them. If the applicants successfully pass the examination and they are allowed to enter the industry, the plant is made as sanitary as possible, medical attendance is supplied, and gymnasium and athletic grounds are often provided for leisure hours. So many accidents on railroads have been due to the defective eyesight of engineers that now all candidates for such positions are required to pass certain eye tests. Many normal schools will admit only those students who pass a standard physical examination. This is as it should be; for the pupil who enters school with such disabilities may have a physical breakdown before the course is completed or may fail in her work. If she enters the profession she may be forced to retire in a short time because of sickness or failure. Every year it is becoming increasingly difficult for those in poor health to enter the professions and vocations

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which are best paid. No matter what work is attempted, ill-health is always a handicap.

The acquisition of knowledge depends on a healthy mind and body. The large number of pupils who fail in their school work because of illness is sufficient evidence of the value of health in getting knowledge. Dr. Rapeer estimates that ill-health and physical defects function largely in causing about fifteen per cent of elimination, sixteen per cent of non-promotion, and seventeen per cent of retardation. A recent investigation of the "Causes of Absence from Rural Schools in Oklahoma," under the direction of Dr. E. N. Clopper¹ shows that illness was responsible for the loss of 44,148 days or about twenty-four per cent of the total number of absences. It is reasonable to believe that much of this was preventable. An enormous amount of evidence has now accumulated to prove that decayed teeth, malnutrition, eye-strain, and unfavorable home and school conditions interfere materially with the mental progress of children.

Health makes for a higher morality. Not everybody who is healthy is honest, truthful, or charitable, but any one who stops to think for a moment will realize that his moral life is likely to have a better tone when he is in a better physical condition. The bad cold tends to make one more irritable and unjust to his fellows; he is more likely to say unjust words, to find fault, to do unkind acts, and to exaggerate his statements in conformity to his moods. There are many cases in our prisons and reformatories and public schools that seem to have criminal tendencies which have been proved to be due to abnormal physical conditions, such as severe eye-strain, impacted teeth, etc. When these conditions have been removed, the individual often returns to a normal moral life.

¹ Child Labor Bulletin, New York, Pamphlet 281, September, 1917.

There was a time several centuries ago when it was believed that the infliction of every sort of hardship upon the body would lead to moral excellence, but these views in the light of modern science have now been discarded.

Health is conducive to happiness. There is a variety of elements involved in the mental state known as happiness, but few will dispute the statement that no matter how successful or prosperous one may be, happiness and ill-health seldom occur together.¹ Everybody knows that even an ordinary malady like a bad cold, a headache, or a toothache upsets one's mental world, causes optimism to give way to pessimism, courage to despair, and enjoyment to physical pain. It is not uncommon to read in the newspapers of men becoming so despondent because of ill-health that they have committed suicide. The man with a good digestion and steady nerves usually sustains the misfortunes of the years with a certain amount of ease and builds a sane and wholesome philosophy.

Preparedness and health. To-day the word "preparedness" is in everybody's mouth. Whether universal peace or more wars are ahead there can be no doubt but that health is necessary for the highest degree of individual or national success. The citizen who is best prepared to do some useful thing well is most valuable to the country. He may serve the cause in field or factory, as a producer of foods, clothing, munitions, or other necessities, or in the trenches. No matter in what capacity he may serve, his value is conditioned primarily, not by his skill, but by his vigor of lungs, heart, muscles, and digestion. The number now engaged in the arts of peace who are suffering from physical disabilities, thereby disqualifying them for the largest measure of service, is, according to our most reliable statistics, so vast

¹ The Virginia State Board of Health publishes these words on all its health bulletins: "Health is Happiness."

as to be appalling. So great are these disabilities that only 30,000 out of the 160,000 men who enlisted in the United States Army in 1915 were accepted.¹ Many of these defects would not interfere seriously with ordinary occupations; yet, says Dr. Small, who analyzed these statistics, in the report of the United States Commissioner of Education for 1916, "the really impressive thing revealed by these figures is the fact that a very large part of the disabilities recorded are of such a nature that they might have been corrected or prevented in childhood by health supervision in the schools." In a similar vein Dr. Averill, editor of the *American Journal of School Hygiene*, writes:

We have failed to mark the suggestive parallel between the physically unfit school-child and the physically unfit soldier. We have accepted silently the reports so often made to the effect that three fourths of all school-children are physically defective and that three fourths of all applicants for admission into the army are similarly defective. It is only in a national crisis such as the present one that these facts are driven home to us in their true perspective. If the crisis develops to more alarming proportions we shall come to feel all the more keenly that, in the last analysis, the real potential bulwark of a nation is the child in the school-room, and that it is largely his opportunities for correct, robust development that measure the ultimate home defense of a people.

As long as our schools tolerate preventable physical inefficiency, just so long must we wait for that kind of preparedness which will not only fit our children to be soldiers, but also to meet the varied problems of life with success.

Health is the corner-stone of good citizenship. The good citizen may be defined roughly as one who provides for his individual welfare and at the same time makes a positive contribution to the welfare of society. The healthy

¹ The requirements for the men of the first draft were not so exacting, but even then 29.11 per cent of the men examined were rejected. (See Preface, p. v.)

man may not be a good citizen because his ambitions and energies are turned in the wrong direction, but certainly a man can do little for himself or his fellow-men unless he has normal physical powers. Health makes for individual and social welfare, happiness, and prosperity. Good citizenship cannot thrive without it.

Disease is preventable: life may be lengthened. Preventive medicine is still in its infancy, but within the last quarter of a century it has recorded some of the most brilliant achievements in the history of civilization. Dis-

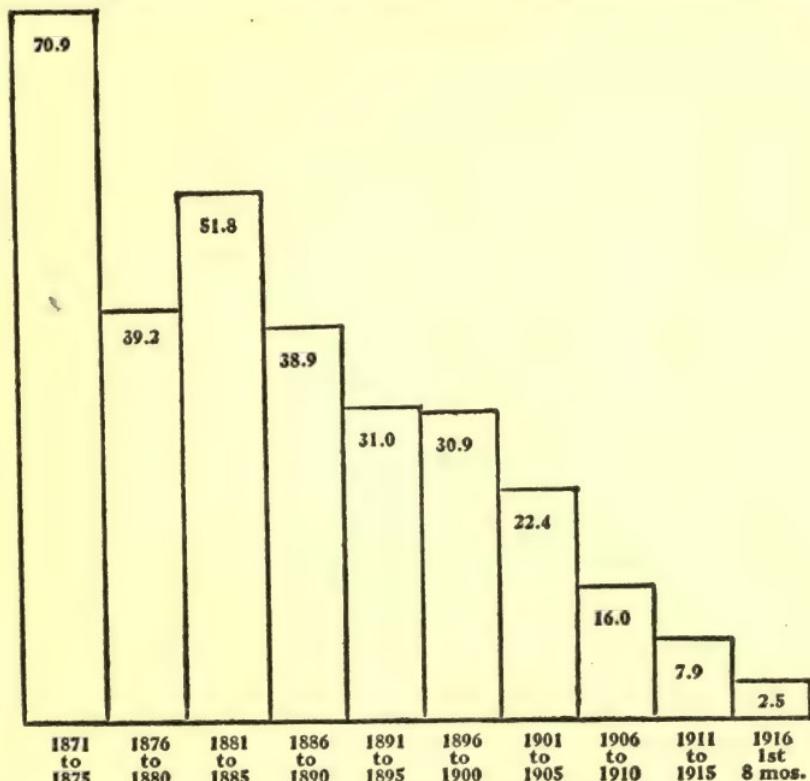


FIG. 1. DECLINE IN TYPHOID FEVER DEATH-RATE IN BOSTON, PER 100,000 POPULATION, BY FIVE-YEAR PERIODS SINCE 1871

A graphic representation of the results of better sanitation and a more careful observation of the laws of health.

(Reproduced with the permission of the Department of Health, City of Boston.)

eases like smallpox have been the scourge of the world, but smallpox has become almost extinct among those nations that have compulsory vaccination. Diphtheria, malaria, yellow fever and typhoid have lost their terrors. Men are beginning to get an appreciation of the view expressed by Pasteur when he said, "It is within the power of man to rid himself of every parasitic disease." Wherever hygiene and sanitation are in control, the average length of life has been prolonged. Dr. Irving Fisher, of Yale, estimates that life may be lengthened at least fifteen years by the application of the fundamental laws of hygiene.

In a booklet entitled *How to Live Long*¹ Dr. Fisher presents fifteen rules of health which, if properly observed, he believes will make for health and long life. The teacher would do well to keep these rules in mind. They are as follows:

Air:

1. Have fresh air where you live and work.
2. Wear light, loose clothes.
3. Spend part of your time in the open air.
4. Have lots of fresh air where you sleep.
5. Breathe deeply.

Food:

6. Avoid eating too much.
7. Do not eat much meat and eggs.
8. Eat various kinds of food.
9. Eat slowly.

Habits:

10. Have your bowels move each day.
11. Stand, sit, and walk erect.
12. Avoid poisonous drugs.
13. Keep away from catching diseases.

¹ Teachers will be able to secure a copy of this valuable publication by writing the Metropolitan Life Insurance Company, New York City. A three-cent stamp should be enclosed.

Activity:

14. Work hard, but play and rest too.
15. Be cheerful and learn not to worry.

Health education is the first work of the school. Reading, writing, and arithmetic have always been considered as the essentials in every educational program, but these are really of secondary importance. Of what use are these tools if one is incapacitated through ill-health from using them. Mental efficiency depends on normal bodily conditions. Since health is not only the foundation of skill, but also of happiness and success and the other virtues that belong to good citizenship, it should be the first aim of the school. "What doth it profit a man to gain the whole world and lose his own health?" Any school that neglects the instruction and training of its pupils in the getting and maintaining of health has no true vision of its real function in society; it is building its house upon the sand.

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CLASS EXERCISES

1. Do you know anybody who was so negligent about the care of his health that he was finally forced to discontinue his work for a long period of time? Estimate the financial loss to him. How did it affect others?
2. Examine the latest report of your State Board of Health for any statements as to preventable financial losses because of illness or death.
3. How much money is your town spending *per capita* for health? Compare this expenditure with the amounts spent for other purposes. Make a graph to show these comparisons.

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4. Visit a rural school. What evidence do you find to show that hygiene is or is not a fundamental subject in the curriculum?
5. Can a teacher do her work better if she is in good health? Why? What are you doing to maintain and also to improve your health?
6. Study your community to determine the most prevalent diseases.
7. Find out the names of the members of your local board of health. Are they efficient and active?
8. Do you know men who were not admitted to the American Army because of physical defects? Find out the exact nature of these defects. Might these defects have been corrected by proper health supervision?
9. Find out the number of absences in some rural school for a term or year? What proportion of them were due to illness? What proportion of these illnesses were preventable?

CHAPTER II

HEALTH CONDITIONS IN THE COUNTRY¹

Statistics show that most physical defects are as prevalent — or more prevalent — among pupils in rural schools as among those who go to school in the city. (*Dr. Thomas D. Wood.*)

The country usually thought to be more healthful than the city. One of the earliest memories of my boyhood was a feeling of pity for those who were compelled to live in the city; for chance glimpses of the metropolitan districts showed that many of the inhabitants lived in crowded tenements and were denied even a plot of green grass. And among the middle classes, who owned houses and lots worth several times more than my father's farm, the space was so limited that I wondered how they managed to live. In a high-school debate on the question: "Resolved, that the country is a more desirable place to live in than the city," I remember that the side in favor of the country based practically all of its arguments on the proposition that the country is much more conducive to health than the city. But, as nearly as I can remember, this proposition was not based on any statistical information, but rather on mere beliefs.

The natural opportunities for health in the country. The belief in the superior healthfulness of the country over the city is due in all probability to the natural advantages possessed by the country. The city being inferior to the country in these respects, the conclusion is that people in the country are healthier than in the city. For example, the inhabitants of the rural districts instead of living in con-

¹ The greater part of this chapter appeared in the *American Journal of School Hygiene* for May 1, 1917.

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gested localities are scattered over wide areas. Often the houses of farmers are miles apart, and, even in the most thickly settled portions of our agricultural sections, the houses as compared with city homes are quite isolated. In the country there is an abundance of fresh air, sunshine, and nourishing foods. The farmer may raise his own fruits,

grains, and vegetables and produce his own eggs and milk. This personal care ought to insure food of good quality and cleanliness. There is little possibility of food being contaminated as it might be if it passed through many hands. People in the country while doing their daily work get plenty of vigorous exercise in the open air. Then, too, the country, because of its quiet, serenity, and beauty, lends itself spontaneously to peace and sanity of mind. While the city dweller lives

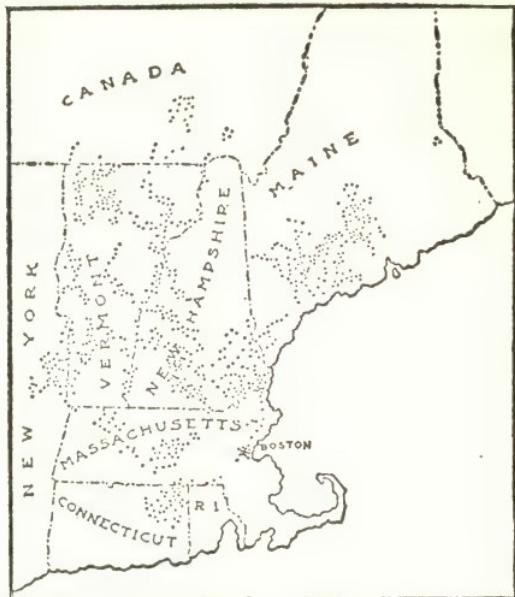


FIG. 2. A MAP SHOWING ONE OF THE DISADVANTAGES OF A LARGE CITY AS COMPARED TO THE COUNTRY

Black spots show the location of dairies which send Boston its daily supply of 370,000 quarts of milk, nearly *ninety per cent* of which comes from *out of the State*. Note the distances of most of these black spots from Boston, showing clearly how such milk must necessarily be *several days old before it even gets to Boston*, after which mixing, grading, pasteurizing, and delivery takes still more time.

(Courtesy of the Department of Health of the City of Boston.)

among strenuous confusion and exacting industrial conditions, the farmer leads an independent life in surround-

ings conducive to health of mind and body. Consequently the people in the country must be healthier than those in the city. Such are the ordinary conclusions. What are the facts? Fortunately a number of investigations have now been made which enable us to establish conclusions on more authentic information.

New York City surpasses country in healthfulness. The study of statistics shows that the common notion of the supreme healthfulness of the country is not based on reliable information. A quarter of a century ago this belief would have been justified; but within the last decade or so the city has made wonderful strides in hygiene and sanitation. The country has lagged behind and its death-rate is practically the same that it was forty or fifty years ago. A

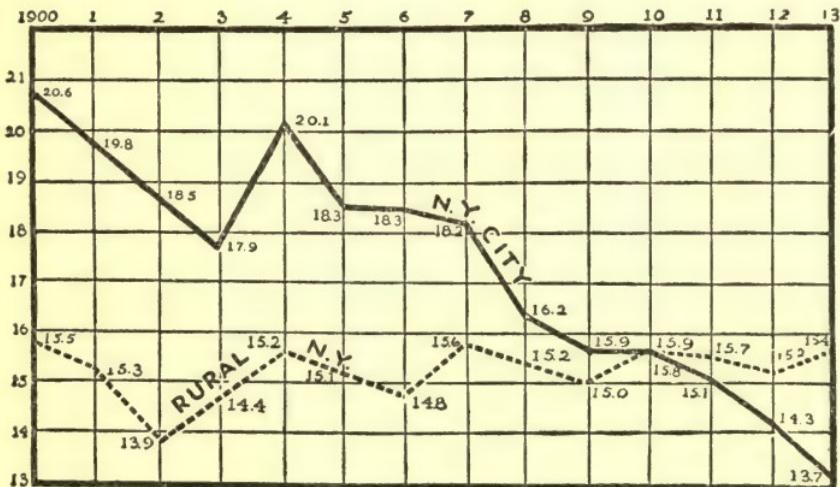


FIG. 3. DIAGRAM SHOWING THE DEATH-RATE IN NEW YORK CITY COMPARED WITH THE DEATH-RATE IN RURAL NEW YORK

(From New York Farmers' Bulletin No. 62.)

glance at the diagram above shows that the death-rate in the city of New York was greater than that in rural New York up to 1910, but after that date it fell below that of

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rural New York. To-day it is safer to live in the largest city in the United States than in the country surrounding it. This is a brilliant achievement in the history of preventive medicine, for it was undoubtedly a result of careful health supervision in matters pertaining particularly to improved sources of the water, milk, and general food-supply, the proper disposal of sewage and garbage, and the application of the laws of hygiene. As Dr. Briggs, the State Commissioner of Health for the State of New York says, "the rural districts have failed to realize the great importance of improved sanitation," and "the rural death-rate from general diseases, typhoid fever, malaria, diarrhoea, and enteritis, is greatly in excess of that in the urban districts." What is true of the State of New York may be typical of the whole of the United States. There is a general consensus of opinion that the country has been touched but little by the great movement of health which has reached our large cities.

Let us consider some of the facts which throw light on the actual health conditions in rural communities.

Defective housing in the country. The broad acres of the country and the long distance between dwellings are so striking that one is likely to overlook the character of the houses themselves. Dr. Bashore, an inspector for the Pennsylvania Department of Health, conducted an investigation which was made for the most part in a typical farming community, inhabited by native-born Americans. His findings are somewhat surprising. He found the housing conditions bad. Much of this was due to defective building. It is unusual in the country to employ an architect. The builder is ordinarily a country carpenter whose first aim is to get the most building on the land for the least money. Sometimes the owner himself plays architect, and then the results very often may be worse. The question

of health has little or no bearing on the character of the building to be constructed. As a result of such a state of affairs country houses often have grave sanitary defects. Frequently they are built on low ground, have inadequate window space, poor lighting, and a questionable method of disposing of sewage.

The illustration opposite page 16, taken from Dr. Bashore's book, *Overcrowding and Defective Housing in the Rural Districts*, shows a type of rural dwelling altogether too common in the country. It is in the open country, but the lack of window space greatly limits the sunshine and ventilation. It has a bad history, having been the home of many suffering from tuberculosis.

Overcrowding and ignorance of hygiene. Even in the open country there is a good deal of overcrowding resulting not so much from bad buildings as from the ignorance of their inmates. In speaking of this Dr. Bashore says: "For example, a nurse from one of the State Dispensaries, in her visiting work, came across a certain farmhouse where five people were accustomed to sleep in one not very large bedroom which had only one small window and even that was nailed shut; one of these five had incipient tuberculosis. These people were well-to-do farmers living in a large twelve-room stone house, and simply crowded into one room for the sake of economy — presumably to save coal and wood."

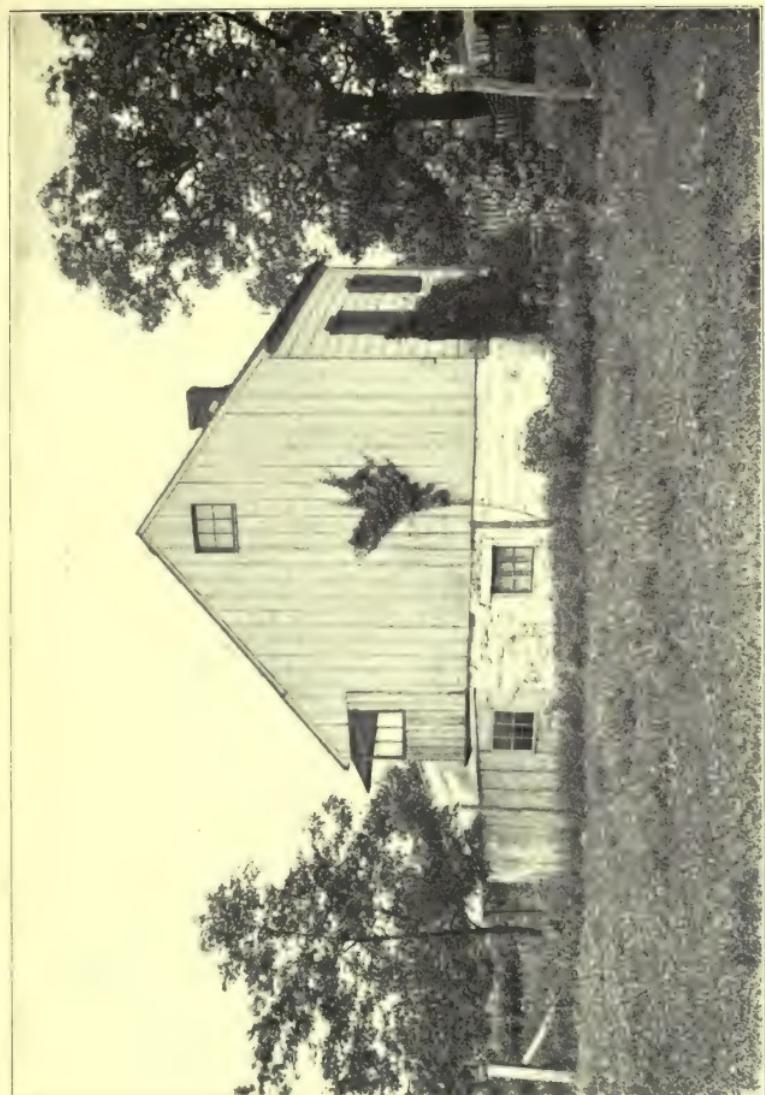
In his interesting study Bashore also refers to the overcrowding in certain mountain districts of Pennsylvania. "It has been noted in these places," he says, "that the natives do not have the strong, healthy build, and a color redolent of health, but the thin, pale, and wan features of those suffering from the lack of pure air. Yet these people live in the purest of God's fresh air, in places akin to those in which we build our Sanatoria. Why is it? In many

instances the explanation seems to be dependent on the personal habits of these mountaineers, who, on the advent of winter, 'hole up,' a good deal like certain animals. They lay in a supply of wood, but as wood is becoming scarce and they are generally lazy and shiftless, the supply is not over-abundant, so they economize space and heat, and have fire only in the cook-stove in the kitchen. Windows and unnecessary doors are nailed shut, and here around the stove the family spend most of the winter, eat and sleep in one or at the most two rooms; and the result? The faces you see here in these mountain homes remind you of the faces you see in the densely crowded, insanitary tenements of the cities. The complete outdoor life of summer is barely able to combat the bad air and lack of air during the winter months, and a chronic condition of lowered vitality results."

To the possible objection that Dr. Bashore's investigations reveal conditions that are not typical of rural districts, let us consider some of the more extensive inquiries and surveys.

A rural sanitary survey of four Indiana counties. During the summer and fall of 1915 the State Board of Health of Indiana conducted a survey of four counties in Indiana. No incorporated towns and cities were inspected because the survey was entirely rural. The rural population of these four counties according to the United States Census method was 24,650, or 69.5 per cent of the total population. The inspectors employed visited every farmhouse in the counties named, made a careful survey of each, and reported their findings.

A simple score card based on ten points, each to have ten for its highest figure, was adopted: 100 was to stand for a house that was perfect in its hygiene and sanitation, and the total of the scores allowed by the investigator would



A COUNTRY "LUNG-HOUSE"

Showing bad building — small windows and lack of windows.

(From Bashore's *Overshadowing and Defective Housing in the Rural Districts*. Courtesy of John Wiley & Sons.)



A MODEL DAIRY FARM

(Courtesy of H. P. Hood & Sons.)



A CLEAN COW BARN IS ESSENTIAL FOR PURE MILK

(Courtesy of H. P. Hood & Sons.)

be the percentage standing. A margin of 25 per cent was to be allowed for the standard, and all homes which scored under seventy-five per cent were to be considered insanitary.

These were the points scored: (1) site; (2) sanitary conditions; (3) house; (4) cellar; (5) ventilation; (6) water-supply; (7) sewage-disposal; (8) barn, barnyard, pig-pen, coops; (9) disposal of manure; (10) health; remarks.

The instructions for scoring were as follows:

1. *Site.* To score 10, the site must be really good, rather high, good natural drainage or else tile-drained or ditched. At least a few trees, pleasant, attractive.

2. *Sanitary condition of premises.* To score 10, premises must be reasonably clean. Not littered, no trash of any amount; order, no confusion must prevail. No sodden or muddy places, cleanliness apparent. Garbage disposed of decently.

3. *House.* To score 10, the house must not be dilapidated. Passable repair, first floor at least two feet above the ground level and ventilated beneath. Interior must be clean and no insanitary smells or odors. Halls and ceilings in good condition; carpets, furniture and beds clean. There must be a general air of cleanliness and comfort.

4. *Cellar.* To score 10, cellar must be dry, clean, well-lighted and ventilated. No decayed vegetables, no trash, no musty or other smells.

5. *Ventilation.* To score 10, windows must be in condition to easily open and close. Ask if in cool and cold weather the house is aired at least once daily and if bedroom windows are *opened wide* at night. If not, the score is 0 unless the house is heated with grates or fireplaces and the door and windows fit loosely, then the score is 5.

6. *Water-supply.* If dug well, score 0. If driven, drilled, or bored, not less than twenty feet deep, good well-curb either of wood, cement, stone, or brick, passable waste-trough or drain, and at least one hundred feet distant privy, score 10, unless analysis is bad.

7. *Sewage-disposal.* If by privy with or without pit, when filthy, if old, dilapidated, not screened, markedly odorous, score 0.

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If by septic tank or underground disposal and working satisfactorily, score 10. If privy has a pit, is in good repair, if properly screened, pit not over three fourths full, not malodorous, then score 10.

8. *Barn, barnyard, pig-pens, coops.* To score 10, barn must be in reasonable repair and reasonably clean, barnyard must be reasonably well drained, clean and free from trash and litter. Pig-pens and chicken-coops must be at least fifty feet from house, and not filthy and malodorous.

9. *Disposal of manure.* To score 10, the manure must be removed every day during spring, summer, and autumn and spread upon the ground, or it must be kept in fly-tight, covered pits or bins. Accumulations of unprotected manure, score 0.

10. *Health.* To score 10, the health of the family must have been good for the preceding two years. One or more cases of typhoid, consumption, dysentery, influenza, severe rheumatism, apoplexy, paralysis, or dyspepsia make the general family health score 0. In scoring health, if infectious diseases have existed within two years, each disease (not each case) cuts off two points.

Inspectors must use their best judgment and common sense in scoring. If any points appear not named in the directions, record the same under remarks, or work them into the score according to reason.

Let us notice some of the general conclusions of these investigators. The average scores for these four counties were 53 per cent, 54 per cent, 43 per cent, and 52 per cent respectively. Ohio County, the county having the highest average score, had these individual scores on the ten points considered: (1) site, 73 per cent; (2) sanitary condition of premises, 68 per cent; (3) house, 68 per cent; (4) cellar, 31 per cent; (5) ventilation, 14 per cent; (6) water-supply, 15 per cent; (7) sewage-disposal, 32 per cent; (8) barnyard, 55 per cent; (9) disposal of manure, 22 per cent; and (10) health, 29 per cent.

In their general survey of Ohio County, the surveyors say: "A review of the points considered shows that 86 per cent of the farmhouses surveyed in Ohio County are in-

sanitary, that the death-rate is higher than the State rate by 0.2 in 1000; that the consumption rate is higher than the State by 25.5, and the typhoid rate is higher by 0.3 in the 100,000."

These figures speak for themselves. They show most deplorable conditions in the country, and the probability is that these conditions are fairly typical of what might be expected in any ordinary rural district in the United States. In fact, it is safe to assume that these counties are far superior in hygiene and sanitation to many counties in the southern part of the United States.

A health survey of White County in Illinois. This survey was carried out during 1915 by Dr. I. A. Foster, medical inspector of the Illinois State Board of Health, and Miss Harriet Fulmer, extension secretary of the Illinois Association for the Prevention of Tuberculosis. White County is in far southern Illinois, and is one of the leading farming districts of the section known as "Egypt." There is nothing extraordinary or peculiar about the county. The inhabitants are Americans living largely in rural communities, the largest town having less than 3000 population. "Of the 23,000 people in the county, about 10,000 live in the towns and villages, over 13,000 being scattered through a rather thickly settled, rich farming country, which has a fair proportion of wooded land and tilled farms, well drained and having the general natural resources for the promotion of health and the development of able-bodied men and women."

The findings in this survey were quite similar to those revealed in the survey of the four Indiana counties to which we have referred. In a region having some wealth and a minimum of poverty, the natural assumption would be that the majority of the people would be well housed, well fed, and living under moderately hygienic conditions.

The investigation shows that darkness and poor ventilation prevailed in the several hundred homes inspected, not because of lack of windows, but because the windows were tightly closed and the shades were drawn to keep out the sunlight. "There is a positive dislike for fresh air among most of the people of this section." There was also much sleeping-room congestion, and, strange to say, this was more serious in the rural sections than in the towns. Filthy and insanitary privies prevailed. The tuberculosis problem was unusually grave.

It is significant that many of the bad health conditions in this county were due not to poverty or to naturally unhealthful surroundings, but to ignorance of the simplest laws of hygiene and sanitation. The following comments taken from the report of the survey are of unusual interest:

It was found during investigation that the dietary of fully seventy-five per cent of the people of White County was lacking in milk, meat, butter, eggs, home-made bread, and vegetables. While no one was found to be actually hungry, there were large numbers of undernourished and anæmic people.

This seemed due in some instances to lack of intelligence; in some instances to lack of physical ability on the part of the head of the family to prepare proper dishes, and in other cases the fault lies with the customs of the people. Poverty and inability to secure food is a factor in only a small percentage of cases.

The water-supply as a rule is only fair. In most instances — as must be true where privy vaults and surface water-supply are employed together — it is a real and serious source of danger. There are few wells. The water usually comes from cisterns which are not properly lined. In two of the larger towns the municipal water-supply comes from a river. Not over twenty-five per cent of the people in these towns take the precaution of boiling the water. Throughout the entire community there is doubtless general soil pollution.

The sanitation of rural schools; a survey of the rural schools of Porter County, Indiana. The bad sanitation in

the rural homes is reflected in their public schools. A number of painstaking investigations of the rural schools have now been undertaken. One of the best of these is the survey of the schools of Porter County, Indiana. This county is in the northwestern corner of the State and borders on Lake Michigan. Its principal industry is farming. In this study seventy-five school-buildings were surveyed and medical tests were made of the pupils in seventy-six schools, including one parochial school, in the rural districts of the county. The survey was conducted by the United States Public Health Service.

The investigation showed that the majority of the school-sites had a fair elevation, but that fifty-seven per cent of the buildings were more than twenty years old and therefore not modern in construction. There was no fire-fighting apparatus in any school. Cloakrooms were provided in only thirty-eight per cent of the schools visited. The water used in seventy-five per cent of the schools was obtained from shallow driven wells. Protection from surface drainage was far from satisfactory. Sanitary drinking fountains were found in seven schools, but were in use in only four. Facilities for washing the hands were limited. Common wash-basins were provided in seventy-five per cent of the schools, but were not in use in many. Adjustable desks were found in 9.15 per cent. The light was inferior in quantity and direction. The humidification of the classroom atmosphere was inadequate in all schools, the relative humidity being under forty per cent in the majority of cases. Among the total number of children reporting on what they had for breakfast only fifteen per cent used milk, while thirty-seven per cent used coffee. The physical defects were varied and numerous. Sixty per cent of the boys and fifty per cent of the girls had some degree of dental defectiveness; 18.3 per cent of the boys and 10.5 per cent

of the girls never used a toothbrush; 57.8 per cent of the girls used it occasionally, and its daily use was noted in but 13.9 per cent of the boys and 40.9 per cent of the girls.

To find such conditions in a prosperous and generally progressive rural district is alarming.

An investigation of the hygienic conditions in typical rural schoolhouses in nineteen States. Dresslar's more extensive study¹ gives a good idea of the conditions that may be assumed to exist throughout the country. State superintendents of nineteen different States were asked to select two counties in their respective States which they regarded as typical progressive counties. A questionnaire was then sent to all the rural teachers in these counties. In all there were 1296 returns.

The returns show deplorable conditions. Sixty-three per cent of the buildings are old, and even the newer ones in the majority of cases have been built with little thought of hygiene. The lighting is usually bad and three fourths of the desks are non-adjustable. The jacketed stove is seldom encountered. Nearly two thirds of the schools depend for their water-supply on springs and wells outside of the school-grounds so that neither clean nor fresh water is available in most cases. The open bucket and common drinking-cup are still in use, and even when the individual drinking-cups are used, they are not infrequently allowed to become mixed. The doors and windows of the school-houses are seldom screened. Toilet facilities are generally a disgrace and a menace to the health of the community. Not more than one per cent of the toilets are sanitary. The school-grounds are, as a rule, too small for the children's play. To add to all these unfortunate circumstances the people in rural communities are usually con-

¹ F. B. Dresslar. *The Hygiene of the Rural School*. N.E.A. Proceedings, 1912, pp. 1103-10.

servative and in little sympathy with progress in hygiene and sanitation.

Minimum health requirements proposed for rural schools. A joint committee on health problems in education of the national council of the National Education Association and of the council on health and public instruction of the American Medical Association has recently prepared a pamphlet on *Minimum Health Requirements for Rural Schools*. These proposed standards should be of great assistance to school boards, superintendents, and teachers because they indicate clearly what conditions should take the place of the intolerable situations revealed by surveys and investigations. The minimum sanitary requirements for rural schools are as follows:

1. Location and surroundings. The school should be located in as healthful a place as exists in the community.

Noise and all other objectionable factors should be eliminated from the immediate environment of the rural school.

Accessibility. Not more than two miles from the most distant home, if the children walk. Not more than six miles from the most distant home, if school wagons are provided.

Drainage. School-grounds must be well drained and as dry as possible. If natural drainage is not adequate, artificial drainage should be provided.

Soil. As every rural school-ground should have trees, shrubs, and a real garden or experimental farm, the soil of the school-grounds should be fertile and tillable. Rock and clay soil should always be avoided. If the soil is muddy when wet, a good layer of sand and fine gravel should be used to make the children's playground as useful as possible in all kinds of weather.

Size of school-grounds. For the schoolhouse and playground, at least three acres are required.¹

A playground is not a luxury but a necessity. A school without

¹ If the rural school plant includes the additional features (a teacher's home, a garden, and an experimental farm), which are already in some progressive States accepted and established as educational essentials, then the school-grounds should contain eight to ten acres.

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a playground is an educational deformity and presents a gross injustice to childhood.

Arrangement of grounds. The school-grounds should have trees, plants, and shrubs grouped with artistic effect, but without inter-

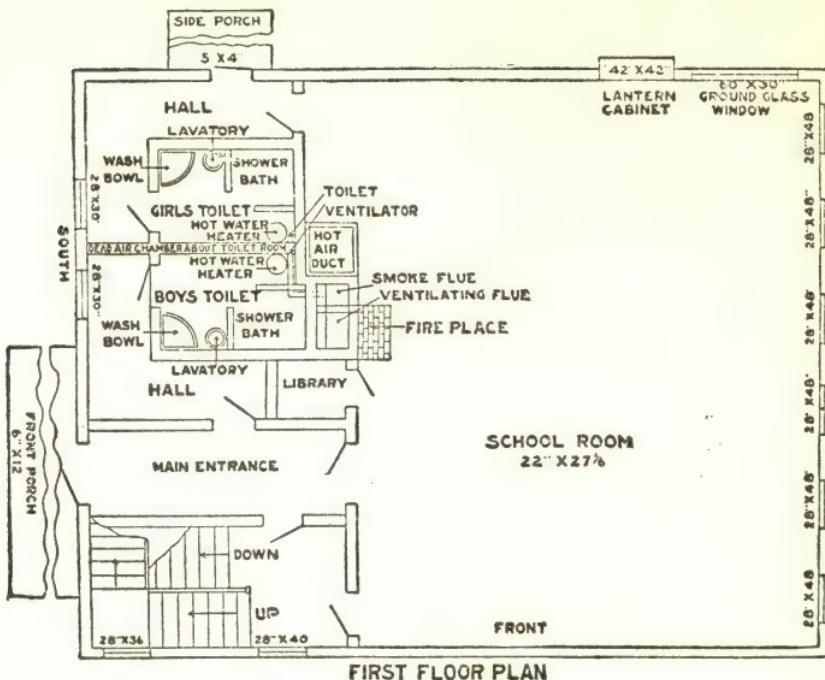


FIG. 4 a. FLOOR PLAN OF THE DEMONSTRATION RURAL SCHOOL OF THE FIRST DISTRICT NORMAL SCHOOL AT KIRKSVILLE, MISSOURI.

The basement plan would also show a gymnasium, water tank, tubs for laundry, etc.

(Courtesy of the First District Normal School, Kirksville, Missouri.)

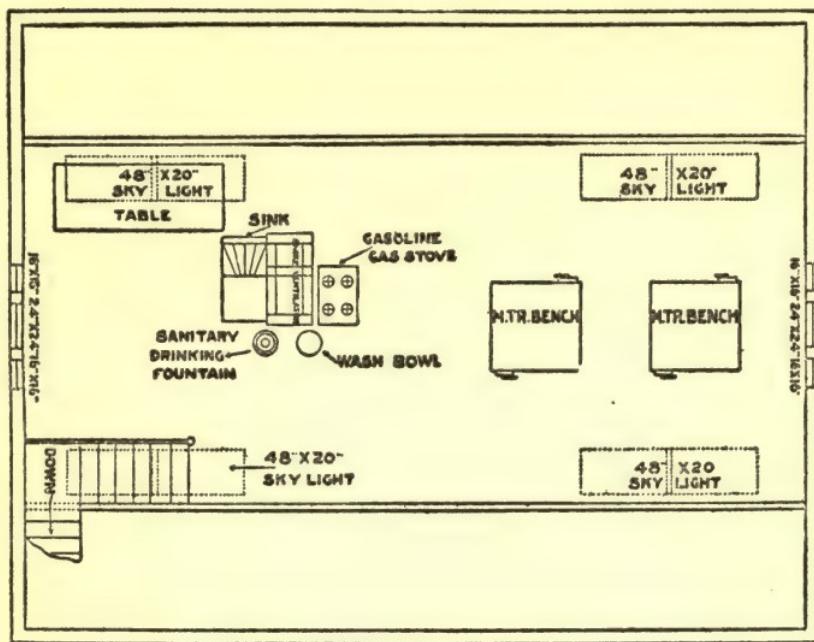
ferring with the children's playground or the lighting of the school-house.

2. Schoolhouse. The schoolhouse should be made as nearly fireproof as possible. Doors should always open outward and the main door should have a covered entrance; a separate fuel-room should be provided; also separate cloakrooms for boys and for girls.

A basement or cellar, if provided, should be well ventilated and absolutely dry.

The one-teacher country school should contain, in addition to the classroom:

- (a) A small entrance hall, not less than six by eight feet.
- (b) A small retiring-room, not less than eight by ten feet, to



ATTIC PLAN

FIG. 4b. FLOOR PLAN OF THE DEMONSTRATION RURAL SCHOOL OF THE FIRST DISTRICT NORMAL SCHOOL AT KIRKSVILLE, MISSOURI.

The basement plan would also show a gymnasium, water tank, tubs for laundry, etc.

(Courtesy of the First District Normal School, Kirksville, Missouri.)

be used as an emergency-room in case of illness or accident, for a teacher's conference-room, for school library and for health inspection, a feature now being added to the work of the rural school.

- (c) A small room, not less than eight by ten feet, for a workshop, for instruction in cooking and for the preparation of refreshments when the school is used, as it should be, for social purposes.

Classroom should not be less than thirty feet long, twenty feet

wide, and twelve feet high. This will provide space enough for a maximum of thirty pupils.

3. *Ventilation and heating.* The schoolroom should always receive fresh air coming directly from out of doors in one of the following arrangements:

- (a) Through wide-open windows in mild weather.
- (b) Through window board ventilators under all other conditions, except when, with furnace or jacketed stove, special and adequate inlets and exits for air are provided.

Heating. Unless furnace or some other basement system of heating is installed, at least a properly *jacketed stove* is required. (No unjacketed stove should be tolerated in any school.)

The jacketed stove should have a direct fresh-air inlet about twelve inches square, opening through the wall of the schoolhouse into the jacket against the middle or hottest part of the stove.

The exit for foul air should be through an opening at least sixteen inches square on the wall near the floor, on the same side of the room as the stove is located.

A fireplace with flue adjoining the stove chimney makes a good exit for bad air.¹

Temperature. Every school should have a thermometer, and the temperature in cold weather should be kept between 66° and 68° Fahrenheit.

4. *Lighting.* The schoolroom should receive an abundance of light, sufficient for darkest days, with all parts of the room adequately illuminated.

The area of glass in windows should be from one fifth to one fourth of the floor area.

The best arrangement, according to present ideas, is to have the light come only from the left side of the pupils and from the long wall of the classroom. Windows may be allowed on rear as well as on the left side, but the sills of windows in the rear of the room should be not less than seven feet above the floor. High windows not less than seven feet from the floor may be permitted on the right side if thoroughly shaded, as an aid to cross-ventilation, but not for lighting.

There should be no trees or shrubbery near the schoolhouse

¹ The following arrangement for ventilating flue is required in one Western State: A circular sheet-steel smoke flue, passing up in center of ventilating shaft (foul-air exit), twenty inches square in the clear.

which will interfere with the lighting and natural ventilation of the classroom.

The school building should so face that the schoolroom will receive the direct sunlight at some time during the day. The main windows of the schoolroom should not face either directly north or south. East or west facing is desirable.

Shades should be provided at tops and bottoms of windows with translucent shades at top, so that light may be properly controlled on bright days.

Schoolroom colors. The best colors for the schoolroom in relation to lighting are:

Ceiling — white or light cream.

Walls — light gray or light green.

Blackboards — black, but not glossy.

5. Cleanliness. The schoolhouse and surroundings should be kept as clean as a good housekeeper keeps her home.

(a) No dry sweeping or dry dusting should be allowed.

(b) Floors and furniture should be cleaned with damp sweepers and oily cloths.¹

(c) Scrubbing, sunning, and airing are better than any form of fumigation.

6. Drinking-water. Drinking-water should be available for every pupil at any time of day which does not interfere with the school program.

Every rural school should have a sanitary drinking-fountain located just inside or outside the schoolhouse entrance.

Drinking-water should come from a safe source. Its purity should be certified by an examination by the State Board of Health or by some other equally reliable authority.

A common drinking-cup is always dangerous and should never be tolerated.

Individual drinking-cups are theoretically and in some conditions all right, but practical experience has proved that in schools, individual cups, to be used more than once, are unsatisfactory and unhygienic. Therefore, they are not to be advocated nor approved for any school.

Sufficient pressure for running water for drinking-fountain or other uses in the rural school may always be provided from any

¹ Sweeping-compounds in moist-proof containers may be obtained in the market.

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source without excessive expense by a storage tank or by pressure tank with force pump.

7. *Water for washing.* Children in all schools should have facilities for washing hands available at least:

- Always after the use of the toilet.
- Always before eating.
- Frequently after playing outdoors, writing on blackboard, or doing other forms of hand work connected with the school.

Individual clean towels should always be used.

Paper towels are the cheapest and most practicable.

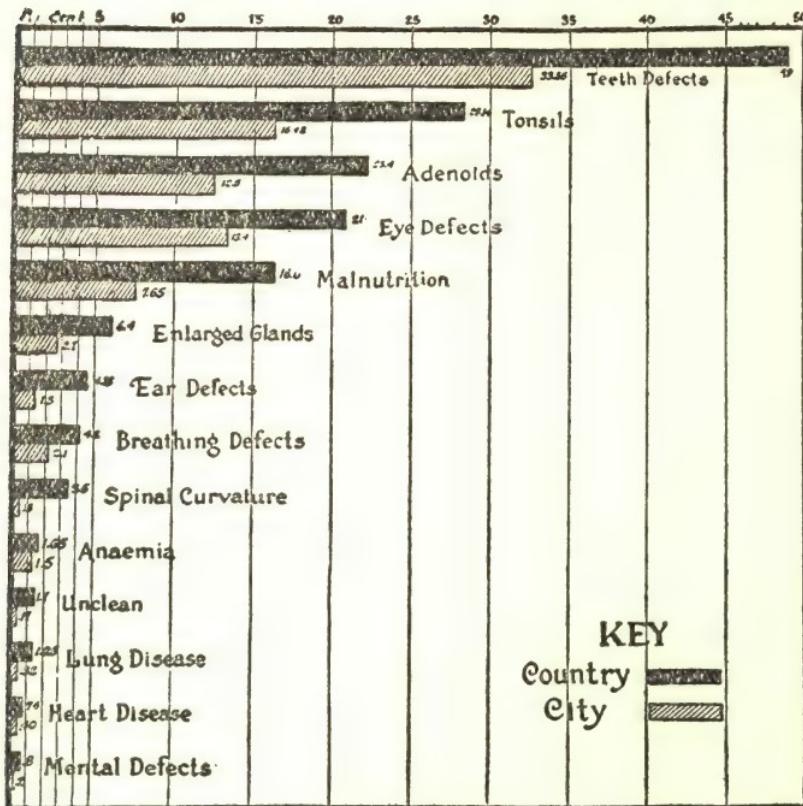


FIG. 5. HEALTH DEFECTS

City children and country children compared. Percentage averages of all available statistics.

(Courtesy of the Committee on Health Problems, National Council of Education.)

The common towel is as dangerous to health as the common drinking-cup.

8. *Furniture.* School seats and desks should be hygienic in type and adjusted at least twice a year to the size and needs of growing children. Seats and desks should be individual — separate — adjustable — clean.

Books and other materials of instruction should not only be sanitary, but attractive enough to stimulate a wholesome response from the pupils.

9. *Toilets and privies.* Toilets and privies should be sanitary in location, construction, and in maintenance.

- (a) If water-carriage system for sewage is available, separate toilets for boys and girls should be located in the school-house with separate entrances on different sides or corners of the school-building.
- (b) If there is no water-carriage system, separate privies should be located at least fifty feet in the different directions from the schoolhouse, with the entrances well screened.
- (c) The privy should be rainproof, well ventilated, and one of the following types:
 - (1) Dry earth closet.
 - (2) Septic tank container.
 - (3) With a water-tight vault or box.

All containers of excreta should be water-tight, thoroughly screened against insects, and easily cleaned at frequent intervals.

No cesspool should be used unless it is water-tight and easily emptied and cleaned.

All excreta should be either burned, buried, treated by subsoil drainage, reduced by septic tank treatment or properly distributed on tilled land as fertilizer.

10. *All schoolhouses and privies should be thoroughly and effectively screened against flies and mosquitoes.*

11. *Schoolhouses and outhouses should be absolutely free from all defacing and obscene marks.*

12. *Buildings should be kept in good repair and with whole windows.*

Belief of Dr. Wood that children in country schools are less healthy than those in city schools. From what has already been said about the lower death-rate in the city

as compared to the country and from the deplorable sanitation in the rural schools, one might anticipate the conclusion that children in rural schools are less healthy and have more physical defects than children in city schools. Dr. Thomas D. Wood,¹ who has investigated the whole matter quite thoroughly, says that statistics justify this conclusion.

The reasons for the physical inferiority of the country child as compared with the city child, according to Dr. Wood, are not difficult to determine. First of all the tide of human emigration toward the city during the last half-century has carried some of the best human stock from the country to the city. Artificial selection has been detrimental to the country. A second reason for this inferiority is that the "science and art of human living, of conserving and improving human health, and general human welfare have advanced much more rapidly in the cities than in the country districts." In the city the problems of safety and comfort have been serious problems to city dwellers and have challenged their attention. The average farmer usually brings up everything on the farm more carefully and more successfully than his own children. The last reason for this astonishing inferiority of the country child, according to Dr. Wood, is the environment. "The farmer's home," he says, "is, as a rule, insanitary in many respects. It is often unventilated and the dwellers in the house are fed many hours a day with bad air. Country water and food are less wholesome than water and food in the city. The standards of living on the American farm, when tested by the accepted principles of sanitation and hygiene, are alarmingly defective." Dr. Wood's observations on the rural school buildings are couched in unmistakable lan-

¹ T. D. Wood. *Health Problems in the American Public Schools*. N.E.A. Proceedings, 1914, pp. 294-301.

guage. "The rural school, from the standpoint of health and general fitness for its important use," he says, "is the worst type of building in the whole country, including not only all types of buildings used for human beings but also those used for live stock and all domestic animals. Rural schools are, on the average, less adequate for their use than prisons, asylums, almshouses, stables, dairy-barns, pigeon-chicken-houses, or dog-kennels are for their uses." It is quite improbable that anybody who is personally familiar with the rural schools of this country will differ from Dr. Wood's conclusions.

Physical defects of country and city people as shown by the first draft of the war. At the close of the present war, when all the statistics relating to the drafts have been collected, classified, and studied, we shall know more about the comparative health of people who live in the country and city. The results of the first draft¹ show that the physical disabilities of men from the country and city were practically the same. Should these results, which are of especial interest because they are evenly distributed over the United States, be confirmed by the later drafts, they will not necessarily show that the deplorable health conditions in rural homes and schools have been exaggerated; the figures will probably be interpreted to mean that people in the country have so profited by their work in the open air, and other natural advantages (pp. 11-13), that in spite of their many insanitary surroundings and lack of hygienic training, they are equal to city people in matters of health.

As the statistics stand, Dr. Wood's investigation, the most complete of its kind, shows that country children are more defective than city children. The results of the examination of men for the first draft would tend to discredit

¹ Edward N. Clopper. *The Draft as a Test of the Nation's Physical Stamina*. Child Labor Bulletin, New York, February, 1918.

this somewhat because they imply that the physical disabilities of men between the ages of twenty-one and thirty-one are the same in the country as in the city. All the available statistics show unmistakably that the old idea that people in the country are healthier than the people in the city is fallacious. But no matter how the statistics may be interpreted, the deplorable health conditions in rural communities and schools and practically a complete lack of training children in health matters will still remain to haunt us.¹ The country is far from living up to its possibilities. With proper health education the country ought easily to surpass the city in healthfulness and produce a vastly larger number of happier and more capable citizens.

The rights of the country child. About 12,000,000, or three fifths of the school-children in the United States, attend the rural schools. These children are entitled to the same privileges of beautiful, sanitary school-buildings as the children in the city. They have just as much right to be healthy and happy. It is a question in which not merely the country but the whole nation is involved, for

¹ H. A. Allan, agent for Rural Education, Maine State Board of Health, writing of the health conditions in the State of Maine (*American Journal of School Hygiene*, November, 1917) says: "Health conditions in the schools of Maine are probably not unlike those of other Eastern States. While no specific figures for the State are available there is little doubt that health conditions of children in the rural communities are less favorable than those of children in the cities and large towns. The organizations and more definite plans for better physical conditions, as existing in some of the large communities for some time past, have accomplished far more than can be brought about by a dependence solely on the advantages of the natural environment. The tonic of the fresh, untainted air of the country could do much for the boy — were it always available to him. But his schoolroom and his home often have no means of ventilation and the windows of his sleeping room may be seldom opened. In many communities no thought has been given to his physical welfare. The problem, therefore, primarily is rural. The awakening of the rural communities and a campaign for better physical conditions in the school and in the home are the pressing demands."

the welfare of the entire nation is dependent upon the efficiency of the farmers, and also upon the splendid leadership which has been contributed to the city by the country.

Health work in city and rural schools compared. If the country is ever to realize her health resources she must begin a systematic and purposeful campaign to improve and conserve the health of her public school-children. In organized health administration and supervision the country has done almost nothing while the city has taken the lead to advantage. The backwardness of the country in health work is shown by the accompanying table prepared by the joint committee of health problems in education of the National Educational Association and of the American Medical Association:

The teaching of hygiene in the rural schools. The general backwardness of the rural districts in matters pertaining to health also extends to instruction and training in hygiene in the rural schools. The teaching of hygiene in city schools has been far from praiseworthy, but the probability is that it is far more practical than it is in the rural schools. Dr. Cubberley in *Rural Life and Education* writes thus of the teaching of hygiene in the country schools:

We have been teaching physiology for nearly half a century in our schools, yet of how little practical use it has been to us. . . . We have learned the names and the number of our bones, the pairs of muscles and nerves, and the anatomical construction of our different organs, but of practical hygiene we have learned but little. Our teachers are not taught such practical hygiene and know but little about it; the people themselves, as a mass, know but very little as to sanitary conditions, and only recently have we begun to direct our attention to the proper form of physiology instruction, but most of this new awakening is due to the state boards of health and to the newspapers instead of the school.¹

¹ For the status of hygiene in our city schools see Andress, *The Teaching of Hygiene in the Grades* (Houghton Mifflin Company, 1918), chap. II.

HEALTH WORK IN CITY AND RURAL SCHOOLS OF UNITED STATES

<i>Activity</i>	<i>For city children</i>	<i>For country children</i>
Medical inspection laws in 23 States.	Mandatory for cities only, in 12 States.	Mandatory for rural schools in 7 States.
Mandatory laws.	Apply to all cities.	In 7 States.
Permissive laws.	Enforced in most cities.	In 6 of the 13 States having such laws.
Medical inspection practiced.	In over 400 cities.	In 13 States, in parts of 130 counties.
Dental inspection by dentists.	In 69 cities.	Permitted in 2 States, but not yet provided.
Dental clinics.	In 50 cities.	In one rural county (St. John's County, Florida).
Clinics for eye, nose, throat, and other defects.	In cities only.	None.
Nurses.	750 in 135 cities.	12 in 20 rural districts.
Open-air classes.	In cities only.	
Athletics and recreation organized with appropriate facilities and equipment.	Practically all cities and large towns.	Little provision in rural schools.
Warm lunches in schools.	In over 90 cities in 21 States.	In a few scattered schools in 9 States.

Local Boards of Health in the country passive. In all rural districts there are local boards of health. Frequently they are elected by the people, but it is seldom, except in the case of some epidemic, that the average citizen in a rural community could even give you the name of the health offi-

cers, much less define their duties. Often these health officers are not even physicians. They may be without any special training and poorly paid. Then, too, the position is often regarded as a political stepping-stone. Even physicians are likely to be inefficient as health officers because the pay is so inadequate or because they may injure their own practice by enforcing the health regulations. The country is greatly in need of trained health officers, well paid and devoting their entire time to their work.

The reports of the State boards of health lament time and again the passivity and general inefficiency of the local boards of health. The following quotation from the report of the State Board of Health of Illinois is typical:

Since White County is under township organization, each township has a board of health, created by State law and made up of the supervisor, assessor, and town clerk. As a matter of fact, this board in White County, as in many other rural communities, may be regarded as a legal fiction. The country districts of the county really have no public health supervision, the only time that the board awakens to activity being upon the appearance of smallpox. Disinfection of premises after typhoid fever is unknown, and this is likewise true after cases of tuberculosis. General insanitary conditions of even the glaring sort are generally ignored.

Better laws on sanitation needed. If the country is to progress in hygiene and sanitation it needs better laws providing for medical inspection of school-children, school nurses, playgrounds, pure water-supply, safe disposal of sewage, etc.; but laws in themselves are meaningless unless supported by public opinion.

Health education more important than health legislation. Good laws are helpful if they are understood and enforced, but any law which excites the antagonism of a considerable number of citizens will not be effective. To get better sanitary legislation the people must be informed on matters pertaining to personal and public health; they must also

have a desire to better conditions. When this time arrives we may expect that the best laws will be put on the statute books, and that they will be enforced.

But health education is even more important than any amount of sanitary legislation; for whether people are to be healthy or not depends not so much on the passage of certain laws as upon the practice of the laws of personal hygiene — matters relatively independent of legislation. I refer to temperate eating, breathing fresh air, exercise, sleep, bathing, correct posture, cheerfulness, etc. Putting into practice these important suggestions necessitates the proper training of our school-children in health habits. For this we turn to the rural school expectantly.

The teacher's opportunity and duty. In this coming campaign of health education for which the rural districts have a crying need, boards of health, physicians, school officers, school superintendents, granges, and clubs may render valuable aid, but the fundamental success of this movement depends on the one in the firing-line — the rural school-teacher. It will be desirable for her to coöperate with all the social forces in the community, and she must take the lead. If the next generation in the country is to be healthier than the present, it will be largely because of the instruction and training of the children in health matters in the rural schools. As we have already observed, the natural opportunities for health in the country are superior to those in the city, but the people in the country are to a very large extent unconscious of these possibilities. The teacher must point these out, and see that some control is gained over them. This is no easy matter, for the ordinary teacher in the rural schools is confronted by insanitary schoolhouses and school-grounds, inferior textbooks, and an ultra-conservative public attitude. The teacher needs to have the conviction that health is far more important than instruc-

tion in any other subject and that the country is at least as much in need of it as the city. She needs to approach her problems with some of the spirit of the missionary — enthusiasm, training, intelligence, tact, and courage to help blaze the trail.

CLASS EXERCISES

1. Make a survey of not less than a dozen farmhouses, using the method of scoring described on pp. 16-18. If an actual survey is impracticable, let every student report on some farmhouses with which he or she is well acquainted. What are the most pressing sanitary needs according to this survey?
2. Investigate the health conditions in as many rural schools as possible according to the minimum health requirements proposed for rural schools on pp. 25-29. What are the chief insanitary conditions found?
3. What are the duties of the local boards of health in your State or community?
4. What State laws refer to sanitation in the country?
5. Does the last report of your State Board of Health say anything about the health conditions in the country?
6. Are there any "lung" houses in your neighborhood? Trace the history of each of them.

CHAPTER III

GETTING CHILDREN TO FORM HEALTH HABITS

The school can do little in the way of giving instruction, but it will accomplish a great deal if it develops an hygienic attitude and fosters the acquisition of certain habits of health that will remain permanent after the children leave school. Instruction is good and it is easy; training is better, but it is difficult. The past decade has been a period of talk about school hygiene; the next decade should be one of training in school hygiene.

(*Dr. W. H. Burnham.*)

HYGIENE in our public schools must be regarded as an intensely practical subject having as its ultimate goal action of fundamental importance to health. This means, as we have pointed out, getting children to form habits. In the past we have relied too much on our faith that knowledge and belief in the right kind of action would result in appropriate behavior. There are numerous examples in everyday life which prove that information when presented so as to appeal to dominant interests does influence conduct quite effectively. Notice, for example, the rapidity with which people make a run on the bank when it is whispered that the bank may not be able to meet its obligations. Boys search persistently for the hole in the river where somebody is known to have had unusual luck in catching fish. The melon patch in the middle of the corn field is frequently doomed as soon as information "leaks" as to its whereabouts. The information on hygiene presented to boys and girls has seldom appealed to their vital interests. If we expect to inculcate health habits, we must plan systematically to get them established and also to test in some degree the results attained. How can we accomplish these ends?

Habits hard to form. One of the most dangerous bits of

pedagogical philosophy of the young teacher, and too often of the older teacher, is the belief that if you talk to children often enough, long enough, and with sufficient vigor about a habit, it will certainly be established. The opposite of this is more likely to be true; for an excess of talk often creates an attitude of indifference or rebellious opposition. This commonly accepted fallacy as to the efficacy of talk in teaching is largely due to the fact that most adults formed their characteristic habits so long ago that the process has been entirely forgotten. The habits gained more recently usually have such a long and varied history that the details cannot be remembered. In taking up the subject of habit in one of my classes in psychology recently, I asked each member of a class of eighty-seven to form a habit and keep a careful record of her successes and failures in maintaining the habit and what helped and retarded the formation of the habit. The conditions were most favorable for successful learning. Each member of the class took some habit which she really wished to form outside of the requirements of the course. She was required to practice the habit for a month or six weeks, and finally to submit her findings in a paper, which was to be marked. Suggestions were given every few days by the instructor so that there might be a tendency to think about the habit. Nearly every habit was a health habit, as taking daily exercise in the open air, proper mastication of the food, correct posture, and cleaning the teeth.

How a habit was formed. It is often assumed that one's success in learning is continuous. The adventures recorded in the diaries of my pupils show that the learning curve goes up and down, and that for some time the habit which is in the process of formation is in grave danger of being destroyed. The following extracts from a typical diary show the difficulties of forming a habit:

On November 20, 1916, I decided to form the habit of brushing my teeth five times per day. I selected this habit because of the serious condition of my teeth. I decided to carry on the operation as follows:

1. Before breakfast.
2. After breakfast.
3. After lunch.
4. After dinner.
5. Before going to bed.

I began my practice November 21, 1916.

Nov. 21. I carried out my practice very successfully, not having one error. This was probably due to the fact that the habit was fresh in memory.

Nov. 22. I had two errors due to forgetfulness.

Nov. 23. There were four errors. Practice was omitted every time except in the morning. It seemed as if I was slowly climbing the ladder of errors instead of successes.

Nov. 24. I determined on this day to omit no practice, but contrary to my determination I discovered at the close of the day I had made one error. This was due to the fact that I had attended a theater party and was very tired when I returned.

Nov. 25. To my regret, on Nov. 25 I omitted the practice entirely. I arose at a late hour in the morning, and in my hurry I forgot the habit, but why I neglected it the rest of the day I am unable to explain.

Nov. 26. I found it was very hard to return again to the habit, and it was at this time I realized the value of the caution, "Allow no exceptions to occur." I struggled through the day with four errors.

Nov. 27. This day I gradually climbed the ladder to success. There was only one error.

Nov. 28. This was certainly a banner day for me — no errors.

Nov. 29. As good as my record for the previous day, my record to-day was bad, for I neglected all practice.

Nov. 30. It seemed as if the Thanksgiving spirit had banished all idea of practice, for I had five more errors to add to my list.

Dec. 1. I returned from vacation with a renewed determination to practice faithfully; nevertheless I had three more errors at the close of the day.

Dec. 2. Two errors — after lunch and dinner.

Dec. 3. I was ill on this day and practiced the habit only once.

Dec. 4. Two errors.

Dec. 5. Only one error, but it seemed as if I could never again reach the point of zero.

Dec. 6. My desire was gratified. No errors.

Dec. 7, 8, 9, 10, 11, 12, 13, 14. On these days I practiced five times per day. I presume the habit is formed. It took three and a half weeks.

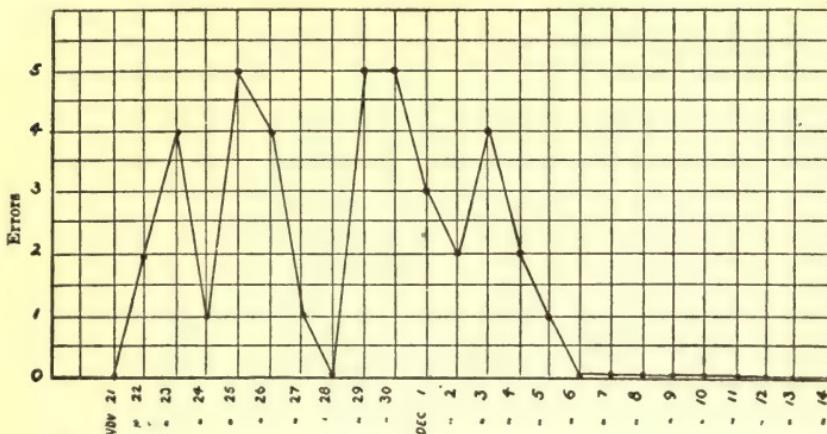


FIG. 6. LEARNING CURVE SHOWING DIFFICULTIES IN FORMING THE HABIT OF CLEANING THE TEETH

Note the irregularity of the curve.

If any of my readers think that the obstacles in the way of forming this habit¹ were unusual, I invite them to try the experiment of forming a habit and writing day by day the story of their achievements. Such an experiment is highly desirable for a teacher, because it enables her to get the child's point of view with greater ease.

Testing habits. After a lapse of five months I was curious to find out whether the habits formed had survived. I asked every member of my class to answer these questions:

1. Is your habit functioning in whole or in part as it did five months ago or has it ceased entirely?

¹ For a more complete discussion of habit than is found in this book, the reader should consult some good standard work on psychology, such as James, *Principles of Psychology*; James, *Talks to Teachers*; Rowe, *Habit-Formation*; and Pyle, *Educational Psychology*.

2. If there has been a weakening of the habit can you give any explanations?

Before answering these questions the pupils were told that their answers would have no effect on their class standing in psychology. Although the opinions of the class as to the condition of their habits should not be considered as scientifically accurate, they are probably not far out of the way. The results (see Fig. 7, below) show that fifty-

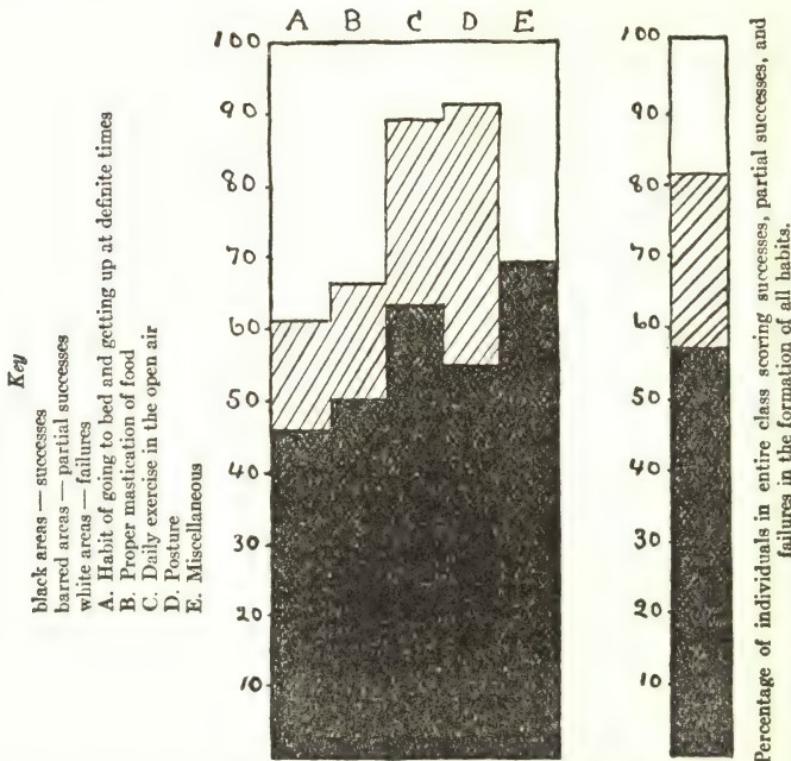


FIG. 7. GRAPH SHOWING PERCENTAGE OF SUCCESSES, PARTIAL SUCCESSES, AND FAILURES IN AN ATTEMPT TO FORM HABITS WITH A MONTH OR MORE OF PRACTICE, ACCORDING TO AN INVESTIGATION MADE FIVE MONTHS AFTER THE HABITS HAD BEEN PRACTICED

(From Andress's "The Study of Habit in a Course in Psychology, with Special Reference to Health Habits," with the permission of the *American Journal of School Hygiene*.)

seven per cent of the pupils were entirely successful, twenty-four per cent were only partially successful, nineteen per cent failed utterly. It will be noted that one pupil out of every five failed to form the habit and one out of every four had formed the habit only partially. It may be said that the measure of success was marked. This is true, but when one considers the favorable conditions under which the habits were practiced originally, it is apparent that it is absurd to think that merely talking to human beings about forming habits will ordinarily lead to their formation. Although this was a study of habit-formation in a class of girls about eighteen years of age, I am convinced that the difficulties in getting school-children to form habits are just as marked.

We will now inquire how habits are formed and why they sometimes lapse.

The need of a motive. The desire to form a habit is of fundamental importance. Unless there is a will to learn there is slight probability that learning of any permanence will take place. To think of doing a particular thing always under given conditions is ordinarily a nuisance to a child unless he realizes some need for that specific action. If a child finds that he can get something which is of value to him, he will exercise effort to act properly. This value or goal is often referred to as a motive. If the teacher can present a motive to children which appeals to some vital interest, she may expect to find the habit started.

Health inadequate as a motive. Since hygiene is designed to teach children how to be healthy, it is usually assumed by teachers that health is the most powerful motive. But health is an abstract term which means little to a child. To tell a child that unless he gets plenty of fresh air and exercise he will not be strong and well has little power to excite him to act. The distant future is

indistinct, colorless, and dull in its interest to boys and girls. The world of the immediate future alone is attractive.

Dr. Thomas D. Wood, who made an extensive investigation of children's attitudes toward health problems by getting children to answer certain questions says by way of summary:

In no answer is there any suggestion that the child is interested in health in the abstract or as a future beneficial state. His sole health concern exists in application and in relation to the immediate present. Interest in growing well and strong is nowhere indicated save as this state gives increased power and capacity for present enjoyment.

There seems to be little possibility that health as a motive will be successful.

Motives that will work. To get desired action the teacher must then appeal to other interests. Children, for example, usually like to be well thought of by their teacher. With such a stimulus children will frequently make an effort to keep their hands clean or correct a slouching posture. All children have a natural interest in competition. One teacher known to the writer was able to get children to keep their hands, nails, and teeth clean by dividing the school into two groups. One group was named "Harvard" and the other, "Yale." Every child was naturally interested to find out which side would win. Honors are sometimes given for distinctive work in certain subjects. This practice is not so common in rural as in city schools, but wherever this method exists honors should be given those pupils who have *practiced* hygiene with special distinction.

Mark pupils for the practice of hygiene. It is customary in many schools to give pupils marks in the different school subjects. Children have usually been given marks in physiology as in the other branches; but such marks have always

been given for ability to master mere information in the textbook. Although the marking system has many abuses, probably everybody is willing to admit that marks of some kind are necessary for school administration, and that they are in most cases motives to children. As long as teachers mark children on the amount and quality of information which they have gained but fail to consider habits, we may expect children to think of information and not habits as being most important. To make parents and pupils feel the importance of forming hygienic habits, it would be desirable to give pupils a separate mark for progress in habit-formation. In the city schools of Newark, New Jersey, pupils are marked for their habits of posture just as carefully and regularly as they are marked in arithmetic or reading.

Practice of habits without exceptions. The teacher who puts her trust in good motives alone is doomed to be disappointed; for even the best of motives does not always lead immediately to action. Often action may be begun, but not continued long enough to lead to the formation of a habit. Psychologists tell us that every act performed makes an impression upon the nervous system, that pathways are opened up so that we tend to repeat a given act. As the repetitions increase, the pathway becomes broader and deeper so that the nervous energy flows along with less resistance. The act which was at first quite conscious becomes unconscious and is performed by us without effort. It is necessary when we first begin to form a habit, like that of cleaning the teeth, to think with some mental strain every time we clean our teeth, but if we practice long enough,¹

¹ Many of the failures reported in the writer's investigation on pp. 42-43, were thought by the pupils to be due to partial formation of the habits. Complete automatization did not result and complete failure naturally resulted.

we shall find ourselves cleaning our teeth at the appointed times almost unconsciously. This unconscious practice of habits should be the goal of all teaching of hygiene. Everybody would be in a morbid state of mind if he found it necessary to think of his health more or less continuously through every day. It would interfere also with other duties. The child who is well trained in hygiene takes care of his health without giving it much attention. This goal will finally be reached by practice — what Dr. Thorndike calls the application of the law of use. When the teacher talks to children about the desirability of cleaning the teeth, she should follow her pupils up to see that they actually practice the habit until it is automatic.

But practice interrupted by frequent exceptions will never be successful. If you decide to clean your teeth every night before retiring, the goal may be approached with the greatest speed if no period of practice is omitted. Every time one forgets or allows himself to disregard the proposed habit, the greater the difficulty in finally forming the habit. It is like trying to wind up a ball of twine. Every time you let the ball fall to the floor and unwind, you find that it is necessary to do more work to get back to the point where you left off. If you drop the ball often enough, your yarn will never be wound. Exceptions in habit-forming weaken the pathways of association and prevent the acquisition of the habit. A number of illustrations of this have been furnished by my pupils. One girl who was trying to get up every morning at a certain time reported that her learning was progressing satisfactorily until the spring vacation when she overslept every morning and forgot all about her habit. After school began, under the prick of conscience she made half-hearted attempts from time to time to resume her previous rising schedule, but eventually every vestige of the half-formed habit disappeared.

It is dangerous for the teacher to relax her supervision over the practice of the habit until it is well established.

Associate pleasure with the practice of desirable habits. Mere practice of a habit alone will not insure success. The writer has always been very fond of fried oysters, and never refused them at the table. One day he ate some fried oysters that had been highly salted. The experience produced such an unpleasant effect that he has not cared for fried oysters since. Unpleasantness may not only break up a habit of long standing, but it may prevent the growth of a habit in its early stages. Some unfortunate experience connected with swimming may hinder, if not entirely prevent, one from learning how to swim. Many experiments performed on animals and children prove what Dr. Thorndike calls the law of effect, namely, that pleasure associated with an activity tends to stamp it into the nervous system and make it permanent, but if the effect is unpleasant the activity will have a tendency not to be repeated.

The application of this principle to the teaching of hygiene is obvious. The teacher must try to make the practice of hygienic habits pleasurable. One of the best ways to do this is to connect the habit with some vital interest of the children. A boy may make no attempt to correct a slouching posture if he is told about the ill-effects upon his health; but if he takes pride in his personal appearance, and if his attention is called to his posture, he may take a real interest in sitting and standing correctly. The improvement is likely to be especially marked if the teacher notes every improvement and comments upon it favorably. As a habit becomes more firmly established, it tends to become pleasurable, even if at the beginning the practice was wearisome, and any tendency to omit practice is accompanied by discomfort. One pupil reports that when she goes to bed without cleaning her teeth, and she remem-

bers it, she feels so uncomfortable that she cannot go to sleep until she gets up and cleans her teeth.

The good teacher of hygiene is conspicuous through the insight and tact with which she is able to make the practice of hygienic habits pleasurable. To do this necessitates a careful study of individual pupils to find out their dominant interests.

Dramatization as a method of teaching. No matter how clearly and definitely instructions may be given in a text-book or how well presented by a teacher, some children will misunderstand, and many of them will find the suggestions exceedingly uninteresting. One excellent method of infusing life into a lesson in hygiene and initiating habits properly is to dramatize hygienic activities.

Let us suppose that children are studying about the care of the eye. Several members of the class may represent a family gathered around a table reading books and papers. Almost anything may be taken for the lamp. The children with the suggestions of the teacher may demonstrate how they would sit with reference to the light, how far and at what angle the books or papers should be held from the eyes, etc. The teaching of action in emergencies, too, offers an excellent chance for dramatization. Children may play that an accident occurs; they may go through all the preparations necessary for the sterilization of a wound, applying bandages, carrying the patient, if necessary, and doing everything needed for his comfort.

Education by dramatization does not stop with the mere acquisition of information. Through action it makes certain, not only that information is gained, but that it is correctly interpreted. Valuable habits are begun and are fused with one of the greatest interests of childhood—physical activity. This is a splendid start. It remains for the teacher to see that these habits initiated by dramatiza-

tion are continued in every-day practice in the school, and to some extent in the home.

Opportunity for practicing habits at school. The teacher must not only instruct children as to desirable habits and present motives of vital interest, but she must also follow up the children to see that these habits are actually established. The teacher will find in school plenty of opportunity to get children to practice hygienic habits. For example, children may have toothbrush drills as a part of the regular work in hygiene and the mouths of the children may be inspected every few days. Not only the teeth, but the hands and nails, may also be inspected. The necessary number of minutes should be assigned on the daily program for this purpose. This may be done very rapidly if properly systematized. The teacher may call on the different rows in turn to hold up their hands. She may then pass along rapidly, giving a word of approval or disapproval as may be warranted. Since clean hands are so necessary as a means of preventing disease, such an inspection ought to be made every day until unclean hands are quite exceptional. To insure clean hands, as in the case of all habits, means should be taken to make the practice of the habit easy. In many rural schools there are very poor facilities for washing and wiping the hands. While many school boards are doubtless remiss in the performance of their duty, it is probably in most cases as much the fault of the teacher as the school officials. It will be a simple matter usually to convince school officers that a wash-dish and clean towels should be provided so that the children may keep clean.

Many of the children in rural communities are woefully deficient in health standards, and while children may read about what ought to be done in the way of sanitation and have valuable information presented by the teacher, as

we have noted before, there may be no practical results. Fortunately in every rural school we have a community with the usual community health problems, such as sewage, water-supply, food, lighting, heating, protection from flies and mosquitoes, etc. The teacher has a splendid opportunity, with the coöperation of her pupils, to help solve these problems in the school, and so not only train the pupils in hygiene, but also help to give the community in the neighborhood of the rural school advanced health standards. The elaboration of this subject is reserved for other chapters in this volume.

Habits formed at school *may not function outside of the school*. It is usually assumed that habits acquired in school will be carried over to the life of the pupils outside of school. This is not necessarily so, and there are serious doubts as to what extent this may be true. Psychology teaches us that habit usually means a definite response to a definite stimulus or situation. Ordinary observation shows that some habits are merely school habits and not home habits or life habits in a larger sense. Children may keep their hands scrupulously clean in school, but be careless about them at home. There are even habits that function only during a particular class period. For example, a child may write well in his copy-book, or during the regular writing period, but present almost an entirely different kind of writing at other times in the school or at home. Different situations lead to different responses. Because one keeps his hands clean does not necessarily mean that he carries clean handkerchiefs or wears clean underclothing. Instead of having a habit of keeping the hands clean, we have *habits* of keeping the hands clean; instead of the habit of cleanliness, we have *habits* of cleanliness. This does not mean that learning to keep one's hands clean at school will never lead to clean hands at home. There is a possibility of a transfer in this

training¹ if the teacher can make pupils conscious of the necessity of doing this at home as well as at school. Here again, however, the teacher will be relying on faith. If possible, she should find some way of getting the child actually to practice hygienic habits at home. A serious difficulty naturally presents itself at this point because the teacher cannot directly supervise activities in the home.

Keeping a health record. One of the chief foes of habit-forming is forgetfulness. Anything which helps to remind the learner of the habit to be formed is valuable. Many of my own pupils tell me that if a habit is not completely established so that it functions automatically, discontinuing the daily record often leads to failure. In some of our best city schools children are required to keep a daily health record. This enables the teacher to correlate actual doing with her regular instruction in hygiene. It makes possible the inculcating of certain habits at home which are being practiced at school, and also other habits, as getting up and going to bed at particular times, activities which cannot be supervised in the school.

The desirability of keeping a daily record to get mastery over a habit was recognized long ago by Benjamin Franklin, who recorded each day his success or failure in the practice of such moral virtues as humility, chastity, tranquillity, justice, etc. He hoped some day to gaze upon a clean sheet — a symbol of a clean life. Franklin's method of moral self-training may with profit be carried over into hygiene.

Mr. Edward F. Brown, superintendent of the Bureau of

¹ The question of the transfer of training is one of the most perplexing problems of recent-day educational psychology. Much of the difference of opinion is a difference of word phrasing. All psychologists practically agree that there is a limited amount of transfer. For a fuller discussion of the problem the reader should consult some good standard work in psychology, such as Strayer and Norsworthy, *How to Teach* (Macmillan); Freeman, *How Children Learn* (Houghton Mifflin Company).

Welfare of School-Children, New York City, proposes a health record for children ten years of age which is equally applicable to rural school-children of the same age.¹ It comprehends hour of rising, toilet arrangements, bathing, mouth hygiene, hygiene of the hair, dress, breakfast, walking, lunch, play, supper, and sleep. This is a copy of the record:

HEALTH HABITS FOR 4A CLASS

	Yes	No
1. Rise at seven o'clock		
2. Toilet.....		
3. Bathe daily, if possible. Otherwise every other day.....		
4. Brush teeth and gums. Wash mouth.....		
5. Exercise for five minutes.....		
6. Clean, comb, and brush hair		
7. Dress lightly in summer; warm in winter.....		
8. Eat breakfast. A good breakfast consists of cereal (eggs if possible), milk, butter, and bread. (State what you had.).....		
9. If weather and distance permit, walk to school.....		
10. Eat lunch. Don't eat if overheated or excited. All meals should be eaten slowly and food chewed well. A good lunch consists of hot soup or broth, meat, vegetable, if possible, and bread.....		
11. After school play outdoors, if possible, for two hours.....		
12. Eat light supper.....		
13. Before retiring brush teeth and gums well.....		
14. Sleep for ten hours.....		
15. Keep windows of sleeping-room open all night.....		

I declare that

I observed of the rules of health.

Mr. Brown recommends that a little time be taken each morning to distribute a blank form to each pupil who would then fill in the record of his activities on the previous day. The standard of attainment might be arrived at in this way:

¹ Edward F. Brown, "Suggesting Another Method of Teaching Personal Hygiene," *School and Society*, no. 82, pp. 148-51 (July 22, 1916).

Observing 15 rules is Excellent.

Observing 13 rules is Good.

Observing 11 rules is Fair.

Observing less than 11 health rules is in the danger zone.

If your record is near or below the danger line, it is time to beware.

Children may be led to characterize their rating as follows:

Excellent. I will be healthy.

Good. I am on the road to health.

Fair. I am not doing all I can to be healthy.

Poor. I am in danger of being unclean and unhealthy.

Bad. I am not clean — I cannot be healthy.

Weekly averages might be made and the records posted to stimulate a friendly rivalry to get into the "I will be healthy group." It is probably true, as Mr. Brown says, that there will be some falsification on the part of the children, but "there will always be a substantial majority of truthful children — those in whom the lesson will be engrafted in a fixed fashion." Even those who have a tendency to falsify will be led to practice these habits to some extent because they are so frequently brought to their attention.

In the upper grades interest may be created by representing the ratings in simple graphs. Mr. Brown suggests that a good record might look like that shown in Fig. 8.

One great advantage of making graphs is that it would stimulate self-competition. It would give the teacher a good idea of the child's deficiencies, so that she might find

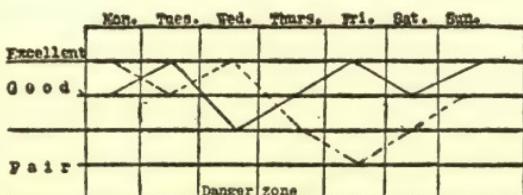


FIG. 8. WEEKLY HEALTH RECORD OF
JANE JONES

Date January 6-13, 1915

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some way of presenting some motive to get better results. If there were medical inspectors and school nurses, the records would be invaluable.

The plan presented by Mr. Brown is meant, of course, to be only suggestive. The teacher in the rural schools would naturally modify the record to suit conditions. A child fifteen years of age, for example, would need less sleep than a child of six. There might also be reasons peculiar to the school or family which would make it undesirable to incorporate all the suggestions given. In initiating the scheme it might be desirable to keep a record of only some half-dozen habits. The writer knows from personal experience that the record is one of the most effective ways of getting habits firmly established.

In making the records a hectograph¹ will be useful, or

¹ Every teacher finds it necessary to make copies of health records, programs or school entertainments, etc. For such purposes a hectograph is almost indispensable. Lincoln, in *Everyday Pedagogy* (Ginn & Co.), gives a number of recipes. The following is composed of ingredients readily available: "Glycerin, 20 ounces; white glue, 5 ounces; water, 12 ounces. Soak the glue in the water overnight, bring to a boil; add glycerin, boil six or eight minutes."

For hectographing a pan about $11 \times 9\frac{3}{4}$ inches is desirable. When the hectograph has cooled, it should be poured into the pan slowly to avoid bubbles. Hectograph ink may be secured from almost any newsdealer.

"To hectograph," says Lincoln, "one should write the copy on well-sized paper with a clean steel pen. The hectograph should then be moistened slightly, and the copy placed face downward upon it for perhaps a minute, till a good impression is left. Then the sheets of paper should be applied, rubbed down firmly, and removed as rapidly as possible. When as many copies as are required have been taken, the hectograph should be washed with a sponge or soft cloth and warm water. The hotter the water the more quickly the cleaning is done, but the more rapidly the hectograph wears away. It should be dried wholly, either by wiping or draining, before putting on the cover, or it will mould."

"If in the hectographing the copy blurs, the hectograph was too moist; if the paper sticks, the sponge may be used to moisten it more without fear of removing the impression, provided the water be cold; it may be moistened if the papers fur and so cover the copy with a little coating

if this does not seem to be feasible, the problem might be met by getting the pupils to copy the record in their notebooks with spaces properly ruled and labeled for the record of each day in the week. In this way the record of a pupil for an entire term might be kept together. At the end of a term, or at the end of the year, a graph might be made to show the results.

Habits to be formed and avoided. It may be helpful to teachers to have a list of some of the health habits which children should be encouraged to acquire, and also a list of those which should be discouraged.

Desirable health habits. (1) Cleanliness of body, especially of the hands, and cleanliness in the schoolhouse and on the school-grounds; (2) cleaning the teeth; (3) ventilating the schoolroom; (4) correct sitting and standing postures; (5) proper breathing; (6) cleaning shoes before entering the schoolroom; (7) correct use of the voice; (8) right use of the eyes; (9) care of hair and nails; (10) use of individual drinking-cups, pencils, and other materials; (11) dusting school-furniture; (12) proper cleaning of blackboards; (13) use of the handkerchief; (14) proper mastication of the food; (15) eating only enough to satisfy the appetite; (16) cheerfulness at mealtime; (17) movement of the bowels once a day; (18) washing hands after going to the toilet; (19) exercise in the open air daily; (20) self-control; (21) sufficient sleep; (22) bandaging for ordinary emergencies; (23) properly cooking a few ordinary foods; (24) care in crossing the street in front of teams and automobiles; (25) care of milk and other foods.

Bad habits to be discouraged. (1) Putting anything into

which obscures. If the hectograph seems too soft, it should be boiled some more; if it seems too dry and cracks, it may be heated and a little more water or glycerin added; if it gets worn and ragged in the using, it may be put into the oven for a moment or two, when it will again cool evenly."

the mouth except food; (2) expectorating on the floor or sidewalk; (3) biting nails; (4) thumb-sucking; (5) "swapping" gum, food, etc.; (6) coughing in another's face; (7) kissing on the lips; (8) carrying soiled handkerchiefs; (9) picking the nose; (10) rubbing the eyes; (11) reading in a dim light; (12) putting foreign bodies in the ear; (13) cracking nuts with the teeth; (14) licking the fingers in turning the pages of a book; (15) overeating; (16) eating when tired; (17) using another person's brush, comb, towel, or drinking-cup; (18) wearing wet clothing; (19) bandaging a cut with a soiled rag; (20) wearing shoes that are ill-fitting; (21) negligence in bathing regularly; (22) not exercising daily in the open air; (23) neglecting a daily evacuation of the bowels; (24) not washing hands after going to toilet; (25) drinking an insufficient amount of water; (26) grouchiness; (27) insufficient amount of sleep; (28) bad sitting and standing postures; (29) eating too fast.

A training class in hygiene. This book will have failed utterly in its purpose if it does not make clear to the reader that the teacher's work is to be judged, not by the character or the amount of information that the children acquire, but by improved tendencies in behavior, particularly in the formation of hygienic habits. The effective teacher of hygiene is one who trains her pupils to act in the right way.

In our best city schools, under the stimulus of medical inspection, a good beginning has been made in actually training children to conserve and improve their health; but the vast majority of our rural schools have scarcely begun to consider the problem. This has been shown by every recent survey of rural schools. The survey of the rural schools of Porter County, Indiana, by the United States Public Health Service shows, for example, that 18.3 per cent of the boys and 10.5 per cent of the girls never used a tooth-brush at all, and the daily use of the toothbrush was

noted in but 13.9 per cent of the boys and in 40.9 per cent of the girls. An investigation of the other hygienic habits, either in these schools or in others, would probably show the same deplorable lack of training.

In previous pages many suggestions have been offered as to how this training may be given. Dr. Burnham has recently suggested that in every rural school a training class might be formed. He describes a visit to a rural school, and offers suggestions as to training in these words:

Recently I visited a little rural school of excellent character. The teacher was intelligent, sensible, interested in her work. She had splendid discipline without any apparent show of authority. The children were bright, helpful, obedient, active, ready to play hard at recess, ready to work in the schoolroom. But apart from the admirable discipline and the scholastic training in the matter of studying the daily lessons, the work of the schoolroom seemed to be all instruction with little or no training. That there was plenty of opportunity in this school for training was obvious. The children might have been more careful in their own personal hygiene; their teeth especially were not properly cared for. As regards the schoolhouse, the toilets, although new, were unsanitary; in the schoolroom the curtains shut out the light from the upper half of the window where it was needed; a little later in the season the room would probably be overheated or improperly heated. In general, the sanitary condition could have been much improved.

This school is typical of a large number, probably of most schools, in the rural districts in this country. In such a school a training class in hygiene would find plenty of opportunity for learning. Among its exercises could be included the acquisition of habits of personal hygiene, normal posture, special care of the teeth, care of the school-grounds, cleanliness of the schoolroom, the use of fresh earth, if nothing better, in the toilets every day, adjustment of the windows for proper ventilation with regard to the direction of the wind, the regulation of the temperature of the room, adjustment of the curtains, and the like. Membership in such a class should be made a mark of honor, since service is always honorable.

With a tactful teacher such a class would give training that would be far more valuable than mere instruction in hygiene.

CLASS EXERCISES

1. Make a survey of your health habits. What habits do you need to form? Practice on one of these habits until it is performed automatically. Keep a record of your successes and failures and everything that helped and retarded your progress.
2. Visit some rural school for a day. Notice whether the instruction in hygiene points directly to habits as a way of solving health problems. Are the children being trained in practical hygiene in the schoolroom? Is the school equipped with sanitary devices so that habits may be formed conveniently?
3. Add to the list of desirable and undesirable habits that children ought to form.
4. Which of the curricular subjects in the elementary school are predominantly informational or idea subjects? Which are predominantly habit-fixing?
5. Enumerate some of the instincts and interests by which all children are actuated. How may health habits be related to these? Give illustrations.
6. Make a catalogue of games and dramatics through which the children could be led to form certain health habits.
7. Recall from your instruction in physiology and hygiene in the grades how much determining influence such instruction has had upon your own health habits.
8. Can you think of concrete instances from your own experience in which information was so compelling as to carry over immediately into decisive action? Describe these instances in detail.

CHAPTER IV

STUDYING THE HEALTH OF THE CHILDREN

It is well then, to begin with the child, for he presages the coming man. He is the plastic material that can be moulded ill or well; he is gigantic in possibilities, but dwarfed if without opportunity.

(*Dr. George B. Mangold.*)

Whatever has to do with the growth of the child has to do with the teacher. No one can teach a sick child. It cannot be done. The building, the equipment, the books, the teacher, are all wasted on the sick child. A sound mind rarely dwells in a sick body.

(*Angelo Patri.*)

To teach hygiene in such a way that children will leave school at the end of the year without a loss of health, and even with a positive gain, necessitates a careful study of each child. Psychology and hygiene tell us that no two children are exactly alike. Any method, then, which attempts to deal with pupils as a mass must be a failure. In the teaching of hygiene the teacher should see that every individual child forms those habits which for him are especially important. A tall, stooped-shouldered boy needs, for example, to give especial attention to his posture; the nervous child possibly requires more sleep; and the child with defective vision needs glasses, or at least improved habits of using the eyes in study.

The need of medical inspection in rural schools. In our large city schools it is practically universal now to employ physicians to examine the school-children. In many systems the physician examines all the children at the beginning of the year to detect the most obvious physical defects. After this initial inspection children are turned over to him by the teachers whenever he presents himself at the school-building, which may be every day or once or twice a week.

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In our best school systems there are also nurses who visit the homes to educate the parents as to what is necessary for the welfare of their children. When the parents are financially unable to coöperate, as, for example, in the case of a child who needs glasses, charitable societies are often appealed to or the matter may be referred to the board of education. Medical inspection has proved to be of great worth in promoting the health of children and thereby securing better work in school; it has also protected society from epidemics, because by this means first cases of diphtheria and other diseases are often promptly discovered and isolated.

The medical inspection of school-children has scarcely made a beginning in our rural schools. (See p. 34). It is a pressing need, since over half of the children of the Nation live in the country, and statistics show that they are not in as good a condition physically as city children, and also that they live under conditions that are not nearly as favorable for health. Then, unlike the city child, they are largely denied medical attention by specialists, such as may be had in hospitals and clinics in cities. There are many obstacles to overcome before medical inspection is legalized in all of our rural schools. One of the chief difficulties is the lack of appreciation of such measures in rural communities. Meantime the wide-awake teacher interested in social welfare may help to get the people in rural districts interested and informed about the prevention of disease and more healthful conditions of living. She may even do something to take the place of medical inspection until the school officials are ready to accept the responsibility. It should be noted, however, that even in schools that have the very best of medical inspection the success of the undertaking depends in large measure on the teacher; for it is she who knows the children individually and recognizes conditions

out of the ordinary. When symptoms are suspicious children may be referred to the physician for examination.

The teacher may discover many defects. Every teacher should be able to discover such difficulties as defective vision, decayed teeth, bad posture, chronic sore throat, etc. Even under the most unfavorable conditions the teacher may find out much about the health of her pupils, and best of all she may do something to correct bad habits and ill-health.

A health survey by the teacher. What the teacher is going to emphasize especially in her teaching of hygiene will be determined largely by the special needs of the children. If most of the children have unclean teeth and bad-looking mouths, oral hygiene should have a conspicuous place in her program. To decide what special health campaign is to be inaugurated she should begin a detailed study of the health of the children as soon as she begins work in a new school. Dr. Hoag believes that ninety per cent of the ordinary defects may be discovered by teachers. It would be well to make a survey of the health of every child in the school, using a form like that on page 62, suggested by Dr. Hoag.¹

The hectograph may be used effectively to prepare copies of this form. If this does not seem feasible the questions may be copied in a notebook (one with detachable leaves would be preferable), space ruled for answers, and the report of each child carefully indicated.

This plan may seem to the reader to be a bit of red tape involving a waste of time, but experience goes to show that making a record like this leads the teacher to observe more accurately than she otherwise would. From such a survey she will know better what to teach in her classes in hygiene,

¹ See Dr. E. B. Hoag, *Organized Health Work in the Schools*. Bull. U.S. Bureau of Education, 1913.

ABBREVIATED CARD FORM OF A TEACHER'S HEALTH SURVEY OF THE SCHOOL CHILD

NAME..... SCHOOL.....

GRADE..... AGE.....

DATE.....

	<i>Yes</i>	<i>No</i>
1. Have you ever been in a grade more than one year?
2. Have you ever had any serious sickness?
3. Do you feel strong and well now?
4. Do you eat breakfast every day?
5. Do you eat a noon meal every day?
6. Do you drink coffee?
7. Do you always have your bedroom window open at night?
8. Have you been to a dentist within a year?
9. Do you have toothache often?
10. Do you own a toothbrush?
11. Do you use your toothbrush every day?
12. Do you have a toothbrush of your own?
13. Do you have much trouble with headache?
14. Can you read writing on the blackboard from your seat?
15. Does the print in your books run together or look dim or crooked?
16. Do your eyes hurt after reading a good while?
17. Do you sometimes see two letters or two lines instead of one?
18. Do you often have earache?
19. Do your ears ever run?
20. Can you always hear the teacher?
21. Do you go to bed by nine o'clock?
22. Do you go to bed by ten o'clock?
23. Do you bathe at least once every week?
24. Have you ever been vaccinated?
25. Have you ever had smallpox?

* Remarks.....

* Find out also the child's height and weight. See pp. 63-68.

what special habits to inculcate, what topics to present at parent-teacher meetings, etc.

While the teacher should begin to observe the children critically as soon as school begins, she should get fairly well acquainted with the children so as to win their confidence before the survey is begun. It is desirable to have the children step to the desk one by one and answer the questions as asked by the teacher. Care should be taken to see that the pupils understand the questions. Answers should not be suggested. The event should not be a formal affair that the pupil will dislike, but on a conversational plane in which the pupil is encouraged to talk freely about himself.

In addition to taking the record as suggested, it would also be well to record some general observations as to whether a child is breathing well, whether the teeth are noticeably decayed, whether he is pale or peculiar in any way, whether he has a cough, running nose, running at the ears, skin trouble, or any swelling about the neck. The eyes and ears should, of course, be carefully tested. (See Chapter XVI.) Such observations should be carefully recorded so that they are readily accessible.

If there is medical inspection, these reports will help the teacher to call the doctor's attention to particular things. If there is no medical inspection, the teacher may eventually, by employing tact, bring certain facts to the attention of parents. This must be done with great care, however, and there must not seem to be any criticism of the home. Coöperation with the home will be discussed more in detail in the next chapter. Outside of any coöperation with the home, the teacher may accomplish much by training the child in the schoolroom and by getting the child to keep health records. (See pp. 51-54.)

The importance of knowing the height and weight of the children. In one of the public schools of New York City

a unique experiment¹ in health education is now going on. It is one of those pioneer movements which promises much for the health of the boys and girls of America if it spreads, as it probably will. It offers some valuable suggestions to rural school-teachers who have enlisted the coöperation of parents, and particularly to those teachers who have good medical inspection in their schools.

In this school all the pupils are weighed and measured and their weights and heights are compared with those of normally developed children. A child that is below the normal weight, especially far below the normal weight, is physically unable to do the work of the school properly. He is in reality a sick child. This deficiency in weight may be due to worry, bad heredity, lack of exercise, eye-strain, lack of sleep, improper diet, or other causes. This school attempts to find out the causes of this short weight and to remedy the conditions. The interest of the boy or girl is aroused and a graph which shows the results from week to week is accurately kept. Those pupils who finally achieve the normal weight are given a certificate of graduation from the nutrition class. The support of the boys was aroused by telling them that they were not in the fine condition that boys as tall as they ought to be. They were also told that they could not play ball and other games as well as they should because their muscles were too soft. Motives, such as being attractive, being athletic, etc., were also presented to the girls. The graphic method of recording the results has proved to be very fascinating to the children, and they have followed the suggestions of teacher and physician with care. The interest and coöperation of the parents has been gained and many of the children have won their certificates.

¹ Camelia Waite Uzzell, "A Demonstration in Health Education, New York," *The Survey*, June 1, 1918.

The graph below shows the record made by one of the members of this class.

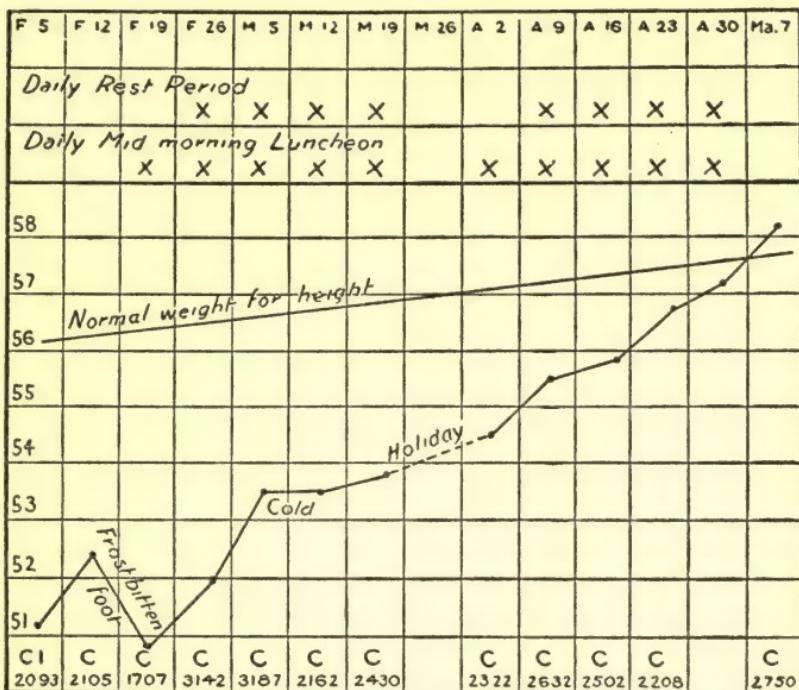


FIG. 9. A NUTRITION GRADUATE

On April 30 Dorothy T.'s weight line crossed the normal and she received a certificate of graduation from the nutrition class. Dorothy is ten years old. She was a "straight nutrition case," needing only rest and "something to interest her in eating." Each vertical line marks a week, and the "C" at the bottom means average number of calories of food per day.

(From Camelia Waite Uzzell's "A Demonstration in Health Education," *The Survey*, June 1, 1918.)

It would be absurd to expect that the rural school-teacher, often with a minimum knowledge of hygiene and assisted by little or no medical inspection, would be able to carry on such an experiment. However, this experiment does suggest several things that a teacher might do. Although few rural schools have scales, it will be possible in most cases to find out the weight and height of the different children. In the case of those children who are under

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weight she can make a special study of the conditions relating to their health. With the help of parents, who may become interested through personal talks or through the medium of the parent-teacher association, much might be done to correct the inferior weight. Doing something to relieve a child from worry incident to school work, advising more sleep, or bringing about any general improvement in health habits, will sometimes help greatly to solve such problems. When a pupil is habitually ten per cent or more under weight parents should usually be advised to consult a physician. The movement inaugurated during the past year by the Children's Bureau of the United States Department of Labor to get mothers to weigh children, if continued in succeeding years, should do much to educate parents. The following table prepared by the Children's Bureau is recommended for the teacher's reference:

TABLE OF HEIGHTS AND WEIGHTS OF CHILDREN

(From the table recommended by the Children's Bureau, U.S. Department of Labor)

Age	Boys		Girls	
	Height (inches)	Weight (pounds)	Height (inches)	Weight (pounds)
5 yrs.	41.6	41.1	41.3	39.7
6 yrs.	43.8	45.2	43.4	43.3
7 yrs.	45.7	49.1	45.5	47.5
8 yrs.	47.8	53.9	47.6	52.0
9 yrs.	49.7	59.2	49.4	57.1
10 yrs.	51.7	65.3	51.3	62.4
11 yrs.	53.3	70.2	53.4	68.8
12 yrs.	55.1	76.9	55.9	78.3
13 yrs.	57.2	84.8	58.2	88.7
14 yrs.	59.9	94.9	59.9	98.4
15 yrs.	62.3	107.1	61.1	106.1
16 yrs.	65.0	121.0	61.6	112.0

To determine whether or not a child is of normal weight in proportion to height, consult the column referring to height, and find the number corresponding nearest to the child's height. His weight, irrespective of age, should be found in the column directly to the right. For example, John is 55 inches tall. According to the table, he should weigh about 77 pounds. If over a series of months he should weigh 70 pounds or less he would be a malnutrition case. A child who is below the height and weight of children of his own age is not necessarily in a serious situation, for he may have normal weight for his height. His inferiority may be due to the small stature of his parents.

One of the common errors in connection with malnutrition, is to think that the home does not provide enough food for the children. This will usually prove to be untrue. Dr. W. R. P. Emerson sums up the question of malnutrition in these words:

The child ten per cent under weight is not well. To say that he is sick comes much nearer the truth. Many think that children outgrow such trouble, but they do not. They grow worse. The child three or four per cent under weight at seven years, may be ten per cent under weight at twelve years, and if the trouble is not removed he grows to maturity with lowered vitality.

The problem in the home is seldom poverty. The under-nourished child often has brothers and sisters who are plump and well, thriving on the food the family can afford.

Neither is it a question of cookery. In the beginning I thought that I would have to teach the mothers to cook, but I soon threw away the cookbooks and dismissed the dietitians. The children will do well enough on the food the household usually provides. All that we have to do is to be sure that they are getting enough of it.

For children in this condition "enough" means from two thousand to three thousand calories of food daily. They are physically bankrupt, practically in the condition of the typhoid convalescent. Like the convalescent, they cannot assimilate large amounts of food at a time, and it is necessary to provide small amounts more

frequently. A light luncheon in the morning and afternoon is important to bring the number of calories up to the required total. Their meals should come at regular hours, and they should be careful to eat slowly, and not to wash down half-chewed foods with quantities of liquids.

Under-nourished children must rest a good deal. They need to store up energy. They have very low endurance and playing or working hard exhausts them more than normal children. Worry about school standing, or anxiety about conditions at home, will reduce the weight of a malnourished child. Malnourished children need rest as much as they need food. They should go to bed early at a regular hour, and have also a rest period morning and afternoon. After any violent exercise they should rest. Such children are constantly drawing on their reserves for the future.

They must have plenty of air. If they sleep in a closed room, or if their breathing is obstructed, they cannot gain. A frequent cause of malnutrition is lack of breathing space due to diseased tonsils and adenoids that cut off the air passages. The removal of such obstructions usually means an immediate gain of several pounds, followed by a steady rise to normal.

Necessity of excluding from school children with suspicious symptoms. For the good of the school and the community children who have suspicious symptoms of contagious disease should be immediately excluded from school. The outbreak of an epidemic, besides being dangerous to the children and causing perhaps immeasurable suffering, interferes seriously with the work of every child afflicted. If the school is closed, it means that the educational advancement of every pupil will be retarded. Should a number of children come down with a disease because of exposure in school, it means that every case will be a means of further contagion to the community. Large sums of money must be spent by parents for doctors' bills. From every point of view the outbreak of an epidemic is dangerous and expensive. There is still one more point to be added — an epidemic is almost entirely unnecessary if

children with suspicious symptoms are immediately excluded from school until their return is recommended by a physician.

The teacher's responsibility in excluding pupils. In our best city schools there are usually certain definite rules and regulations about the exclusion of pupils from school. For example, a pupil complains of sore throat; he is referred at once to the school physician who examines the throat and takes a culture. If, after a microscopic examination, which takes a few hours, there is a report of diphtheria or malignant sore throat, the child is legally excluded from school. Not until one and sometimes two negative cultures are taken will the pupil be allowed to return. Under such conditions it is comparatively easy for the teacher to perform what is obviously her duty.

In the rural schools the situation is quite different. The legal authority of the teacher is limited, and the rural community has not yet been educated to the point where it will always appreciate the teacher's efforts. Every teacher before beginning to teach should know exactly what her legal authority is with reference to the exclusion of children from school because of suspicious symptoms. Such information may readily be secured by addressing a letter to the State Department of Education. The expert at the head of this department has various titles, as State Commissioner of Education or Superintendent of Public Instruction. A copy of the school law of the State will usually give all the information desired. There is a decided tendency at present to give the teacher more and more authority. The State of Pennsylvania has gone perhaps further than any other State in its latest quarantine laws, making every teacher practically an assistant health officer. The Pennsylvania law outlining their duties according to the act of 1915 is as follows:

That every teacher, principal, superintendent, or other person or persons in charge of any public, private, parochial, Sunday or other school, having in any such school any child or person showing an unusual rash or skin eruption, or complaining of soreness in the throat, or having symptoms of whooping-cough, or any disease of the eye, shall immediately exclude such child or other person from the schools, pending the action of the health authorities, and shall report such fact to the health authorities, and shall report such fact to the health officer of the city, borough, or township, giving the name and residence of such child or other person.

Such regulations uphold the action of the teacher and give her an opportunity to offer refractory parents who may be dissatisfied with her action satisfactory and substantial reasons.

According to Dr. Royer,¹ the latest quarantine law not only gives the teacher legal authority, but also provides that a teacher shall be subject to penalties and fines if she fails to comply with the law. Such ironclad authority vested in the teacher is a great step forward in effective health administration.

Unfortunately, in the vast majority of States the teacher has little if any authority in excluding pupils from the school on account of illness or suspicious symptoms. Her way is therefore more difficult. What she will be able to do in the way of sending home pupils with particular symptoms and recommending to parents that a physician be consulted will depend on the attitude of the community toward health problems. The coöperation of the community may be enlisted to a large extent through the discussions of such problems at parent-teacher meetings. (See Chapter V.)

Symptoms warranting exclusion from school. If the

¹ B. Franklin Royer, *The Teacher's Function in the Prevention of Communicable Diseases, with Special Reference to Legal Authority*. Proceedings, American School Hygiene Association (1916), pp. 91-95.

school is not to become a disease center, it is imperative that the teacher recognize suspicious symptoms of disease early and that children having these symptoms be sent home until a physician recommends their return. This may be difficult and in some cases a questionable policy, but that the rural community needs to be educated to appreciate and demand such procedure is indisputable. As Dr. Royer says:

There seems to be no good reason why any teacher, finding a pupil in her school with reddened eyes and coughing or sneezing, should not suspect measles and immediately exclude that child from school pending a definite diagnosis. There seems to be no good reason why any pupil with an acute sore throat or sore throat and sick stomach could not be kept from exposing other pupils to probable diphtheria, tonsillitis, or scarlet fever, all these afflictions being characterized by sore throat, and scarlet fever notably with sore throat, sick stomach, and vomiting. There is no good reason why any teacher should not exclude from association with his fellows any child with a florid rash that might easily be developing scarlet fever, measles, or German measles. And so with the various eruptive affections of the skin, such as scabies, ringworm, favus, particularly if the section of the body involved is exposed to the teacher's view.

Dr. Thomas D. Wood¹ refers to these indications of health disorders in children for which parents should keep the children at home and notify the school:

Nausea or vomiting.

Chill, convulsions (fits).

Dizziness, faintness or unusual pallor (alarming paleness of the face).

Eruption (rash) of any kind.

Fever.

¹ See *Health Essentials for Rural School-Children*, prepared by Dr. Thomas D. Wood, Chairman of the Committee on Health Problems of the National Council of Education, 525 West 120th Street, New York City. A copy of this valuable pamphlet may be secured free by applying to Dr. Wood. Enclose a three-cent stamp with your letter.

- Running nose.
- Red or running eyes.
- Sore or inflamed throat.
- Acutely swollen glands.
- Cough.
- Failure to eat the usual breakfast.
- Any distinct or disturbing change from usual appearance or conduct of child.

These signs are also recommended to teachers "as a basis for excluding pupils from school for the day or until signs have disappeared, or until the proper health officer has authorized the return of the pupil to school."

What teachers ought to know about the ordinary contagious diseases of childhood. If the teacher is to come in contact with the parents and community and teach the children how to avoid diseases of childhood she ought to know something about the signs and symptoms of the most common maladies, the method of infection, the possible after-effects and the period of exclusion desired. An excellent discussion of these topics is to be found in Hoag & Terman, *Health Work in the Schools* (Houghton Mifflin Company, Boston). As it is impossible to consider these matters in detail in this volume the reader is referred to the accompanying highly condensed table taken from the above-named book.

In looking over this table the teacher will notice how many of these diseases at their outset appear like a cold. Sore throat, inflamed and running eyes, feverishness, and running at the nose are common symptoms. If public opinion were enlightened such pupils might be promptly excluded. However, the teacher may direct children so inflicted to sit apart from others, to cover their coughs with pocket handkerchiefs, and to take the ordinary precautions against the spread of disease.

The table follows:

COMMON TRANSMISSIBLE DISEASES OF SCHOOL-CHILDREN¹

Disease	Principal early signs and symptoms	Method of infection	Remarks	Period of exclusion recommended
	Begins like cold in the head, with feverishness, running nose, inflamed and watery eyes, and sneezing; small crescented groups of mulberry-tinted spots appear about the third day; rash seen first on forehead and face. The rash varies with heat; may almost disappear if the air is cold, and come out again with warmth.	Forced exhalation and discharges from nose and mouth.	After-effects often severe. Period of greatest risk of infection, first three or four days, before the rash appears. May have repeated attacks. Great variation in type of disease. Often fatal.	Four to five weeks.
	Measles			Three weeks.
	German measles		Forced exhalation and discharges from nose and mouth.	After-effects slight.

¹ With acknowledgments to *The Health Index of Children* (Hoag).

COMMON TRANSMISSIBLE DISEASES OF SCHOOL-CHILDREN (continued)

Disease	Principal early signs and symptoms	Method of infection	Remarks	Period of exclusion recommended
Diphtheria	Onset insidious: may be rapid or gradual. Typically sore throat, great weakness, and swelling of glands in the neck, about the angle of the jaw. The back of the throat, tonsils, or palate may show patches like pieces of yellowish-white kid. The most pronounced symptom is great debility and lassitude, and there may be little else noticeable. There may be hardly any symptoms at all.	Forced exhalation and discharges from nose, mouth, and ears.	Very dangerous both during attack and from after-effects. When diphtheria is occurring in a school, all children suffering from sore throat should be excluded. There is great variation of type, and mild cases are often not recognized, but are as infectious as severe cases. There is no immunity from further attacks. Membrane may occur in nose only.	Six weeks, or until all diphtheritic germs have disappeared from cultures taken from throat.
Whooping-cough	Begins like cold in the head, with bronchitis and sore throat, and is a cough which is worse at night. Symptoms may at first be very mild. Characteristic "whooping" cough develops in about a fortnight, and the spasm of coughing often ends with vomiting.	Forced exhalation and discharges from nose and mouth.	After-effects often very severe, and the disease causes great debility. Relapses are apt to occur. Second attacks rare. Specially infectious for first week or two. If a child is sick after a bout of coughing, it is most probably suffering from whooping-cough. Great variation in type of disease.	Two months, or until cough and vomiting cease.

COMMON TRANSMISSIBLE DISEASES OF SCHOOL-CHILDREN (continued)

Disease	Principal early signs and symptoms	Method of infection	Remark	Period of exclusion recommended
Chickenpox	Sometimes begins with feverishness, but is usually very mild and without sign of fever. Rash appears on second day as small pimples, which in about a day become filled with clear fluid. This fluid then becomes matter, the spot dries up, and the crust falls off. May have successive crops of rash until tenth day.	Forced exhalation and crusts on the spots.	When children return, examine head for overlooked spots. All spots should have disappeared before child returns. A mild disease and seldom any after-effects.	Till all scabs have disappeared.
Scarlet fever or scarlatina	The onset is usually sudden, with headache, languor, feverishness, sore throat, and often the child is sick at the stomach. Usually within twenty-four hours the rash appears, and is finely spotted, evenly diffused, and bright red. The rash is seen first on the neck and upper part of the chest, and lasts three to ten days, when it fades and the skin peels in scales, flakes, or even large pieces. The tongue becomes whitish, with bright red spots. The eyes are not watery or congested.	Forced exhalation and discharges from nose and mouth, particles of skin, and discharges from suppurating glands or ears. Milk especially apt to convey infection.	Dangerous both during attack and from after-effects. Great variation in type of disease. Slight attacks as infectious as severe ones. Many mild cases not diagnosed and many concealed. The peeling may last six to eight weeks. A second attack is rare. When scarlet fever is occurring in a school, all cases of sore throat should be sent home.	Six to eight weeks, or until desquamation has ceased.

COMMON TRANSMISSIBLE DISEASES OF SCHOOL-CHILDREN (continued)

Disease	<i>Principal early signs and symptoms</i>	<i>Method of infection</i>	<i>Remarks</i>	<i>Period of exclusion recommended</i>
Mumps	Onset may be sudden, beginning with sickness and fever and pain about the angle of the jaw. The glands become swollen and tender, and the jaws stiff, and the saliva sticky.	Forced exhalation and discharges from the nose and mouth.	Seldom leaves after-effects. Very infectious.	About a month.
Influenza	Begins with feverishness, pain in head, back, and limbs, and usually cold in the head.	Forced exhalation and discharges from the nose and mouth.	Excessively infectious. After-effect often very serious and accompanied with prostration and nervous disability.	About three weeks.
Smallpox	Illness is usually well marked and the onset rather sudden, with feverishness, severe backache, and sickness. About third day a red rash of shot-like pimplies, felt below the skin and seen first about the face and wrists. Spots develop in two days, then form little blisters, and in another two days become yellowish and filled with matter. Scabs then form, and these fall off about the fourteenth day.	Forced exhalation; all discharges, and particles of skin or scabs.	Is peculiarly infectious. When smallpox occurs in connection with a school or with any of the children's homes, an endeavor should be made to have all persons over seven years of age vaccinated. Cases of modified smallpox — in vaccinated persons — may be, and often are, so slight as to escape detection. Fact of existence of disease may be concealed. Mild or modified smallpox as infectious as severe type.	Till all scabs have disappeared.

CLASS EXERCISES

1. Is there medical inspection of schools in your State? If so, find out all you can about the work that is being done.
2. If there is medical inspection of city schools near at hand, try to see the inspector at work. How are the teachers coöperating with the inspector? What suggestions do you get from such a visit that would be helpful to a teacher in rural schools where there is no medical inspection?
3. Does the teacher have any legal authority in your State to exclude from school children having suspicious symptoms? Look up the law in detail.
4. Make a health survey of your own school. What are the most serious physical defects found? What percentage of the children do you find in excellent health? What percentage have serious physical defects? How many are under weight? How will the results of this survey affect your plan of instruction and training during the year?
5. Are there any charitable or philanthropical societies in your neighborhood which employ a district nurse? If so, interview such bodies and endeavor to persuade them to coöperate with your school in furnishing an occasional nurse whenever occasion demands.
6. Look over the reports of your State Board of Health and your State Superintendent of Schools for facts regarding the health of school children. To what extent are the rural school-teachers doing active health work in their schools?

CHAPTER V

SECURING THE COÖPERATION OF PARENTS AND COMMUNITY

The home must not abdicate in education unless the whole basis of our civilization is radically to change. Those who are laboring with wisdom, effectiveness, and patience to bring the home and school into closer understanding and more intimate coöperation are real benefactors. (*Nicholas Murray Butler.*)

THE teacher who attempts to put into execution the suggestions given in this book will meet with absolute failure if she ignores the sentiments of the community where she teaches. This is particularly true if she happens to have been born and educated in the city and so is unfamiliar with the customs and traditions of rural communities. The country districts are conservative, but if approached in the right way they respond quite readily to able and tactful leadership. It is well for the teacher to realize that parents can be led, but that they cannot be driven. It is the purpose of this chapter to indicate briefly what the teacher may do toward assuming this leadership and enlisting the interests of the rural community.

Visiting the homes of the children. When the teacher begins work in a new school, it would be an excellent plan to call at the homes of the children as soon as she feels fairly well acquainted with the children. If the teacher boards in the community — and such a plan is highly desirable to get the best results — such visitation should entail no hardship. Such calls need not be long and ordinarily the conversation should not dwell exclusively on school matters. It would be well for the teacher to show an interest in the varied activities of the neighborhood.

Such brief visits will enable her not only to begin the acquaintance of the parents, but also to observe to some extent some of the most pressing health problems. To form a strong and sympathetic bond between the home and the school, the parents must, of course, be interested in the school. A really intelligent interest is impossible unless they know something about its work. For this reason parents should be invited to visit the school.

The support of the school officials. The coöperation of local boards of education is indispensable, not merely because they control the expenditure of money for school purposes, and so may do much to hinder or help the work of the teacher, but also because they are commonly the most influential men of the community. Their sympathy with the teacher's aims makes it easier for her to be recognized as a leader in the community. If they will accept the suggestions of the teacher, much may be done for the sanitation of the schoolhouse and grounds and the health of the children. Such problems as cleaning outhouses, getting proper school furniture, books, etc., cannot be solved to any great extent without the active interest of the school board.

Ways must be found to arouse and maintain this interest. The methods will be determined in large measure by the teacher on the ground. One of the first things to do is to get acquainted with the members of the board. If the teacher wishes really to gain some influence with them she must first reveal herself as something besides a school-teacher. She must be a human being. She needs to talk intelligently and interestingly about the things that are vital to these men and their families. Sometimes this co-operation may be gained by asking for the advice of members of the board as to certain school policies, sometimes through their own children who are in the schools. When there are

school entertainments, sociables, or picnics, and members of the board are present, it is always a good plan to assign to them places of importance, as chairmen of committees. Some teachers have found it advisable to invite all the members of the board to visit the school on a certain day to see what the school is doing. Under such circumstances these men would appreciate being asked to make a few remarks, even if they felt obliged to decline. The tactful and enthusiastic teacher will find many other ways of getting the support of the school board.

The need of a parent-teacher association. This need of a closer union between the home and the school has begun to be keenly felt throughout the country within the last few years; it has given rise to that splendid organization known as the parent-teacher association. In our large cities it has attracted the attention and won the support of our best educators. "In parent-teacher meetings," says Superintendent Slaton, of Atlanta, Georgia, "full, free, and friendly discussion establishes the relations that ought to exist between the parent and the teacher. The mother and father are made to see their vital opportunity in shaping the child's destiny, and the teacher is broadened by learning the conditions in the home. Consequently the parent and the teacher form a common understanding, each teaching the other some vital truth that both ought to know. Much time is saved, friction between the teacher and pupil is averted, and unkind feeling and complaint against the teacher is made impossible. The pupil is rendered more receptive, the teacher more patient and intelligent, and the parent more sympathetic and appreciative. The product of all these combined forces is the maximum good to the child, who is both the foundation and the maker of our civilization."

Ella Flagg Young, formerly Superintendent of Schools

at Chicago, says: "Observations of the spirit pervading the meetings of Parents' Clubs lead me to believe that in these clubs is the corner stone for that structure which will make the life of the child in the home and in the school a unity, not a life divided between two neutral, if not hostile, camps."

In our rural districts where there is so often a dearth of social activity and where every innovation in the school runs counter to a thoroughgoing conservatism there is a still greater need of some kind of organization where teacher and parents may get together to discuss freely their common problems. Such an association has an influence over all the activities of the school; but is especially promising in the field of hygiene. Geography, grammar, history, arithmetic, spelling, and writing may all be taught efficiently without any special coöperation of the home, but *stable education in hygiene makes the support of the parents almost a necessity.*

Achievements of parent-teacher associations. The parent-teacher associations in the short time that they have been in existence have accomplished noteworthy results. A list of these achievements gives a good idea of the many different ways in which a club for parents and teachers may be helpful. While these results have been gained largely in cities a majority of them could be reproduced in the country. Some things that have been done by the parent-teacher associations are here noted:¹

1. Provided educational courses for mothers.
2. Increased and bettered legislation for children and women in both communities and States.
3. Lifted home ideals, taught better methods of sanitation, encouraged a better and more nourishing dietary.

¹ Compiled by Frances Johnson in *Parent-Teacher Associations*, Bulletin No. 3, April, 1913, State Normal School, Cheney, Washington.

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4. Lightened the problems of school discipline.
5. Established circulating libraries in connection with schools.
6. Provided equipment for schools, such as paper towels, sanitary drinking-fountains, warm lunch, manual training, and household economics equipment.
7. Has brought about needed reforms in school management, sanitation, equipment, and curriculum.
8. Introduced medical and dental inspection and the study of sex hygiene.
9. Provided playground apparatus, supervision of playgrounds, and physical instructors.
10. Improved school-grounds, through planting of shrubbery, flowers, vines, etc.
11. Encouraged contests in flower- and vegetable-raising by providing seeds and rewards for best production.
12. Encouraged and stimulated home industry for boys and girls with school credit.
13. Purchased musical instruments for the study of the best music, and stereopticons for the study of the best picture and geography work.
14. Instituted campaigns of education in favor of simple school dresses for girls.
15. Supervised places of amusement for children, like moving-picture shows, school parties, etc.
16. Furnished rest rooms for teachers.
17. Created a sentiment for coöperation and good-will between teachers and parents, so that teachers are investigating home conditions affecting children, and parents are studying the school curriculum and environment with the view of bettering conditions.
18. Established social centers, often in the schools.
19. Established kindergartens.
20. Received the endorsement of boards of education and State superintendents and have been made advisory councils to local school boards.
21. Aroused public sentiment to the needs of school improvements before school boards pass on them, in order to have a community backing.
22. A hospital clinic was established in Los Angeles, California, where last year seven hundred school-children have been made well and strong.

How to organize a parent-teacher association. Before undertaking to organize one of these clubs it would be desirable to write to the National Congress of Mothers and Parent-Teacher Associations, 910 Loan and Trust Building, Washington, D.C., and state that it is intended to form an association in your school and that you would appreciate receiving any material designed for free distribution. Also enclose four cents in stamps for the pamphlet *How to Organize Parents' Associations and Mothers' Circles*. The literature which may be secured from this source free or for a nominal sum will prove helpful in almost every emergency which may arise.

One of the difficulties in forming the organization is to get parents together for the first time. If they come the first time and are pleased, it will be easier to get them to come again. The simple announcement that such an association is to be organized will not be attractive enough for them to make a sacrifice to be present. Some teachers have found it helpful at this first meeting to get up some simple kind of entertainment at which the children will participate or to invite in some special musical talent or a well-known speaker. Just what is to be done will be determined by the time and place of the meeting. The school-house would seem to be the best place because it is usually centrally located, and will accommodate everybody who may attend, but most of all because it is highly desirable that parents should get into the habit of coming to the school and getting familiar with the house and grounds, thereby getting some good notion of the physical needs of the school. Probably it would be most convenient to the patrons of the school if the meetings were held regularly in the afternoon after school. But all questions as to the final time and place of meeting would naturally be determined by the patrons after the first meeting.

If the association is to have a good start, the teacher should not merely call the meeting and let it drift. She should have the details all thought out. If there has been no previous organization of its kind in the district, the patrons even before the meeting must have some realization of its purpose. As the teacher visits the homes of the children or incidentally meets the parents, she can tell about this great movement which is sweeping over the land, why it is needed, and what it is accomplishing. Usually the parents will consent to attend at least the first meeting. Before the meeting is called the teacher will know that enough have declared themselves in favor of it to insure a good attendance.

A strong sentiment for the formation of a parent-teacher association should be created at the first meeting. For this purpose the parents need to be clearly informed as to the purpose of such an organization. It would be advantageous to get somebody who has had first-hand experience in such clubs to present the aims and tell something about results. Some higher school official, as the County Superintendent of Schools or the Superintendent of some town near at hand, might be secured. If this proved to be impossible, it might be managed by the teacher herself. What she has to say should be thought out very clearly beforehand and presented in a natural but convincing way, after which officers should be elected and arrangements made for the next meeting.¹

The meetings of the association. The teacher must necessarily be the guiding spirit in every parent-teacher organization, but she will bear in mind that the success of the undertaking will be largely proportionate to the degree in which every member takes an active part. Although she should be able to advise wisely when called upon and

¹ For details of organization, see the pamphlet mentioned on page 83.

should be the general director of the club, she should try to make herself inconspicuous rather than prominent. If the parents once get an idea that it is the teacher's association, it will meet with a speedy death.

Since the number of meetings for a year must be limited, each meeting, if it is to be really worth while, must be carefully planned. Some definite practical problem needs to be presented and there should be an opportunity for every member to take part in the discussion. This can best be insured, perhaps, by calling on everybody in order. After a paper has been read or a topic presented orally, there will be a chance during the discussion which follows for parents and pupils to exchange points of view and finally hit, perhaps, on some scheme of coöperation. Let us suppose, for instance, that Mrs. J. presents the topic of flies as disease-carriers. In such a presentation Mrs. J. may tell about their method of carrying disease, the kinds of disease transmitted, and the manner in which they may be exterminated. If the schoolhouse is frequented by flies, it might be an excellent plan to have this topic brought up during the fly season so that the patrons of the school may observe the dangers to which their own children are subjected. Few rural schools are screened, and it often happens that children find it impossible to eat their lunch without danger of having their food infected by the filthy insects. Then, too, it is not uncommon to find that privies are so open that their contents are exposed to flies. Parents will be interested to know whether the health of their children is being protected. As a result of the discussion and inspection, the teacher may tell about the lessons she is giving the children on flies and her plan of getting the children to screen the doors and windows themselves. The parents will naturally be glad to coöperate by encouraging the children and also perhaps by contributing screening or netting for the pur-

pose. If the right kind of interest is aroused, the school board may be asked in a friendly way to clean and repair privies. It is hardly likely that all these results would be achieved in one meeting, but there seems to be no reason why these ends should not finally be gained.

There should be no hesitation on the part of a parent to be a leader because of inability to write a paper or give a talk, as papers on the most important topics may be borrowed for a nominal sum from the National Congress of Mothers and Parent-Teacher Associations, Washington, D.C. All these papers are prepared by experts in some department of child study.

It would be well to vary the meeting now and then by asking somebody outside of the community to give a talk. When some special problem regarding health is under consideration a physician might be invited to make a few remarks. This would sometimes be very profitable in educating parents, especially in cases where modern hygiene runs counter to some of their most stable traditions. One of these ancient traditions refers to children's diseases. Most parents in our rural districts to-day accept without any qualification the exploded theory that it is a good plan for children to get diseases like measles and whooping-cough early in life, as the disease if contracted later is likely to be more severe. Frequently parents see that their little children are exposed as a means of protecting their health. In the light of such a belief, parents are not likely to take precautions against the contraction of the disease, nor are they inclined to look with favor on any plan proposed by the teacher to isolate from school children that have symptoms of these diseases. The truth of the matter is that these diseases in early childhood are dangerous and the longer they can be postponed the better.

Of whooping-cough, a so-called minor disease of child-

hood, Dr. Chalmers,¹ statistician of the New York State Department of Health, says that it "has carried off more lives in New York State during the past five years than the much more dreaded scarlet fever. The total number of deaths from scarlet fever during the years 1911-1916 was 2904, equivalent to an average rate of mortality of 5.9 per 100,000 total population. During that same period 3739 children died from whooping-cough, which corresponds to an annual death-rate almost thirty per cent higher than scarlet fever — 7.6 per 100,000." In summarizing Dr. Chalmers says:

A disease which carries off each year in New York State between seven and eight hundred lives (most of them children under five years of age); which causes long periods of illness among forty times the number of persons it kills; and leaves the patient debilitated, and very susceptible to broncho-pneumonia, diarrhoeal disorders, and not infrequently predisposing to tuberculosis — surely such a disease is more than "a minor disease of childhood," subject to the indifference of parents and the neglect of local sanitary authorities.

Dr. Chalmers also notes something which is of considerable interest to rural school-teachers: the mortality rate from whooping-cough in the country is much higher than in the cities. This he believes is due to the energy of the larger cities of the State in "employing more effective measures to detect, isolate, and control cases of whooping-cough."

Such information as this might be effective if read to a group of parents, but it would probably be more so if presented by some physician who had the respect of the neighborhood.

Subjects on health for parents' meetings. The problems to be considered at parents' meetings will be governed to

¹ *Health News*. Monthly Bulletin. New York State Department of Health, March, 1917.

a large extent by the most pressing problems of the school and the community, yet it is sometimes helpful to have a number of topics suggested from which to choose. The National Congress of Mothers and Parent-Teacher Associations, Washington, D.C., publish much literature which may be suggestive. The organ of this Congress is the *Child-Welfare Magazine*, issued monthly, subscription \$1.00 per year. Study outlines for mothers' and parents' associations and valuable papers on child nurture appear in its columns. Leaders in educational work are among its contributors. A sample copy of this magazine may be secured free by addressing *Child-Welfare Magazine*, P.O. Box 4022, Philadelphia.

The writer would suggest the following subjects relative to health as being valuable for discussion in parent-teacher associations in rural schools:

1. Important health habits and how they may be formed.
2. The value to the pupil of keeping a health record.
3. The purpose of medical inspection; why it is needed in the rural schools.
4. What symptoms would justify the teacher or pupil in excluding children from school until a physician can be called.
5. The dangers from children's diseases; the value of postponement.
6. How disease may be carried.
7. The prevention of common colds.
8. The fly problem — what are we doing to solve it?
9. The rat as a menace to health — how he may be destroyed.
10. The educational and hygienic value of play.
11. The effect of bad posture on health and how it may be corrected.
12. School lunches — how they may be made inviting and nourishing.
13. Should children drink tea and coffee?
14. The care of the eyes.
15. The care of the ears.
16. The care of the teeth.

17. The value of exercise.
18. Home credit in hygiene.
19. Sanitary privies for rural schools.
20. What playground apparatus do we need and how can we get it?
21. The care of the baby.
22. First aid to the injured.
23. Why cities are more healthful than the country.
24. The teacher's aims in teaching hygiene.
25. Hygiene in the home.
26. Sex hygiene — why it needs to be taught. Who shall teach it, the teacher or parent?

How parents may coöperate with teachers to get children to form habits. In the previous pages the formation of health habits has been emphasized as being of fundamental importance. Success in getting many of these habits established depends on the sympathetic insight of the parent into the teacher's plan and a willingness to help. As the teacher makes a survey of the school and gets pupils started in keeping health records, she will find a good deal in their lives that needs to be corrected. Here, for example, is a boy with a bad standing posture. He may be assigned, as a part of his school work, the problem of correcting his own posture with the understanding that he is to be marked on his results. The teacher may remind him of his failures in the schoolroom, but without the help of the parents it may never be corrected. The father or mother who appreciates the danger of being round-shouldered and knows what effort the teacher is making to get the boy to overcome his defect may render valuable assistance.

Then there are some habits over which the home has practically entire supervision, as those of securing the proper number of hours of sleep, the daily evacuation of the bowels, chewing food thoroughly, avoiding excessive use of condiments, etc. It would be an excellent plan at one

of the first meetings of the year to put into the hands of every parent present a copy of the health record which children are to be encouraged or required to keep, to state the reasons why it is important, and to ask the aid of parents. Not infrequently teachers learn that parents are only too happy to lend assistance, as they have tried, but in vain, to get their own children to form some of these habits. The teacher and parent working together may achieve what neither was capable of accomplishing separately. As time goes on, it should be less difficult to confer with parents about the health of their own children.

The appeal to neighborhood pride. Nothing will so stimulate a community as a belief that it is accomplishing something as good as if not better than other communities. The newspaper may be used effectively to arouse such pride. The editors of rural weeklies are usually glad to publish notices or articles of community interest. Reports of meetings should be brief and to the point. They should give the name of the leader, the topic to be discussed, and the time and place of meeting. Other announcements of events, such as the making of play apparatus by the children, the grading of the school-yard, and stereopticon lectures on health, might also be written up and offered for publication.

CLASS EXERCISES

1. Present as many reasons as you can to show that parent-teacher associations should be organized.
2. If possible attend the meeting of some parent-teacher association. Report just what took place.
3. Add to the list of topics suggested for discussion on page 88.
4. Try to recall what evidences there were of intimate relationship between the home and the school in your own early school life.
5. Do you think that, on the whole, country people are more or less amenable to wise leadership than city people? Which type is more interested in the public school?
6. Make out a program for the first meeting of a rural parent-teacher association.

CHAPTER VI

PLANNING THE COURSE OF STUDY IN HYGIENE

Unless we can devise methods of transforming *our hygienic knowledge into hygienic doing, our service will remain futile.*

(Dr. W. H. Burnham.)

IN our city schools the work in the various subjects is organized so that a particular field is covered in each year's work. This is made possible in the city because the schools are carefully graded and a printed course of study is usually provided. In rural schools the conditions are usually quite different. Often the teacher stays in one school but a few months, she leaves to her successor almost no record of the work done, there is little or no attempt at grading, and it is seldom that a course of study exists.

The value of a course of study. In previous pages we have referred to the necessity of having clear and specific aims in teaching if worth-while results are to be achieved. A good course of study is especially important because it sets up general and specific aims and suggests subject-matter and methods by which they may be realized. If there is no course of study there is a great probability that some things of importance will be omitted and that other things will be repeated several times, until they become tiresome to the pupils. This is the situation with reference to health instruction: The teacher finds certain textbooks in the hands of the pupils, and without regard to their content, pages of subject-matter are assigned and pupils are asked to reproduce the information gained. The textbook may be inaccurate as to the most recent developments in hygiene or it may emphasize anatomy and physiology and only refer to hygiene in a most superficial way. It may make no

reference to health problems of special interest to people in a rural community. The pupils may have gone through these books several times before. All this makes no difference. There may be no supplementary reading and the teacher's time is, of course, limited. The easiest and best way will often seem to be that of slavishly following the textbook. Hygiene is usually a tail-end subject that is taken up in a "hit-or-miss" fashion. It is seldom that pupils can tell what they have learned with reference to health except that certain pages have been covered. Simply because a school is not graded is no reason why there should not be a course of study. Let us suppose that there are two classes in hygiene, an advanced class including, roughly, pupils in grades seven and eight, and a more elementary course including pupils taking work corresponding to grades five and six. Often there will be two textbooks, one for each class. Under ordinary conditions a pupil would be in the same class for two consecutive years and might cover the same material each year. If the teacher has a broad point of view as to health education, she will plan a course for each year which is distinct from the other. Half of the textbook might be covered each year and enough other work assigned independently of the book to keep the pupils interested and busy. If a teacher is to remain but a short time in a school, such plans for the future may seem unnecessary and a waste of time. It is the business of the school superintendent, if there happens to be one, to call his teachers together and plan the course of study. But if there is no definite course of study, the teacher should see that her instruction is not aimless and without result. A preliminary study of the schoolhouse and grounds, the children and the community, should give the teacher points as to a profitable health program for a series of months or for a year. It is the definite campaign which attains results.

even over a comparatively short time. It would be well to remember that getting mere information which does not lead to action is worthless.

Relate information to habits to be formed. It is a fallacy to imagine that a child must always have a scientific reason as to why it is necessary to do certain things. Children may be taught, for example, to clean their teeth without appreciating the meaning of such words as germs, infection, dyspepsia, etc.; yet there always comes a time when children have a natural curiosity to know about such things. Information concerning such matters will doubtless assist at such times in getting the habit established. This does not mean, however, that the mere gaining of information by children is useful. As hygiene is usually presented, they get a very distorted notion about matters of fundamental importance.

The futility of attempting to teach the rather technical aspects of the subject to immature minds is seen in answers given by pupils on examination. Professor Gregg¹ gives these quotations, which he says are typical of the answers taken from an eighth-grade examination from one of the most progressive counties in Nebraska:

- “A common disinfectant is smallpox.”
- “Mastication is what is going on.”
- “Epidermis is a certain kind of medicine.”
- “The diaphragm is another word for backbone.”
- “The bones are made up of hard mucous membrane.”
- “Pericardium is something that will put you to sleep.”
- “Respiration means all the different juices in the body.”
- “The diaphragm is very delicate and is located in the head.”
- “Fumigation is when the air is shut off and death may come.”
- “The Eustachian tube is a tube running all over the body.”
- “The nervous system is a kind of tube where the blood vessels are in.”

¹ F. M. Gregg, “Teaching Hygiene as Nature Study in the Elementary Grades,” *American Journal of School Hygiene*, April, 1917.

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"The process of digestion causes headaches and much impure blood. Fried potatoes often causes digestion."

"The way to treat a burn is after I burned it I would put my finger on the stove just where I burned it before."

"A disinfectant is anything you catch by going where they are. Measles and chickenpox are disinfectants. When you have them you should stay in the house and keep warm and try not to give them to others. Pimples on the face are not disinfectants but some kinds are."

Such answers show inability to think clearly and accurately about ordinary health affairs, and also to appreciate the importance of health habits. Fortunately in Nebraska there is a great movement on foot to correct such useless teaching. Information presented to children needs to be simple, interesting, and to have a direct reference to the formation of good habits.

In considering, for example, the physiology of digestion, the function of mastication might be emphasized and the need of thorough mastication pointed out. In discussing the use of the saliva in digestion, those conditions which influence a bountiful supply of the saliva, such as appetizing food, pleasant surroundings, and a happy frame of mind, should be noted. Pupils may then be led to see what they can do to help the process of digestion. The course of study, or the teacher's plan of health campaign, should select that information and organize it in such a way that it will tend to function in action.

Plan of outlining course of study. In most courses of study in hygiene the habits that are to be formed do not stand out on paper, nor is it clearly seen just how information to be gained is organized so as to motivate particular habits. This is a serious mistake. The course of study¹ for the fourth grade, on page 95, tends to bring out clearly

¹ Prepared by a committee of Boston teachers of whom the writer was one.

the two important elements in every course of study in hygiene, namely, information and habits, and shows the relation between them. The most important habits which teachers are advised to follow up vigorously are printed in bold faced type. Although designed primarily for city schools, there is nothing in its content that would not make it useful in its present form in a rural school. It is reproduced here in the hope that it may be suggestive to school superintendents and teachers in planning their work in hygiene.

COURSE OF STUDY IN HYGIENE FOR THE FOURTH GRADE

Habits to be formed

I. Cleanliness.

A. Skin and Hair.

1. Take warm bath weekly.
2. Wash face, neck, ears, daily.
3. Times for washing hands.
 - a. Wash hands before meals.
 - b. Wash hands after going to the toilet.
 - c. Wash hands before going to school.
4. Keep nails cut and clean.
Demonstration and inspection.

B. Teeth.

KEEP TEETH CLEAN

1. Clean the teeth before going to bed.
2. Clean the teeth after eating if possible.
3. Keep brush in a dry, clean place; and, if possible, in the sunlight.
Demonstration and inspection.

C. Nose.

1. Use a clean handkerchief.
2. Put handkerchief before face when coughing, and also when sneezing.
3. Keep hands away from nose, mouth, and eyes.

D. Elimination of waste.

1. Have a daily movement of the bowels.

Information to be acquired

I. Cleanliness.

Need of bathing.

A. Skin and Hair.

1. The need of weekly bath.
2. Need of the daily washing of face, neck, and ears.
3. Times for washing hands.
 - a. The vital need of washing hands before meals.
 - b. The vital need of washing hands after going to the toilet.
 - c. Need of washing hands before going to school. (Need of carefully drying hands.)
4. How to cut and clean the nails.

B. Teeth.

Need of cleaning the teeth.

The care of the temporary teeth as important as that of the permanent teeth.

Care of the sixth-year molar.

Need of regular visits to dentist.

C. Nose.

Danger of a soiled handkerchief.
Blow the nose gently.

D. Elimination of waste.

1. Necessity of getting rid of the waste of the body at regular times.

(Pamphlet from City Hospital.)

Coarse foods as a prevention of constipation.

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2. Go to the toilet at definite times.
- E. Cleanliness in school.
1. Deposit all wastes in barrels provided.
2. Do not spit on the premises.
Inspection.
- II. Clothing.
A. Cleanliness.
1. Put on clean underclothing after weekly bath.
2. Air and brush outside clothing.
- B. Protection.
1. Removal of extra clothing.
a. Take off outer wraps in schoolroom.
b. Take off rubbers when indoors.
2. Take off wet shoes and stockings at home.
- III. Fresh air and sunshine.
1. Keep curtains up.
2. Open windows day and night.
- IV. Food and drink.
A. Mastication.
Chew food slowly and thoroughly.
B. Clean food.
1. Wash raw fruit before eating.
2. Do not exchange partly eaten food.
3. Drink from an individual cup.
- V. Exercise and rest.
1. Play at recess and after school.
2. Go to bed early.
- VI. Posture.
Sit, stand, and walk correctly.
- VII. Eyes.
1. Read with the light at the left or right side or at back.
2. Read only with a good light.
3. Wear your glasses all the time.
4. Keep your glasses clean and adjusted.
2. Necessity of definite times for urination.
- E. Cleanliness in school.
Cleanliness makes for health.
- II. Clothing.
A. Cleanliness.
Need of clean clothing.
- B. Protection.
1. Importance of putting on extra clothing when out of doors.
2. Importance of removing wet clothing.
- III. Fresh air and sunshine.
Necessity.
Suggested experiments.
Plants and fresh air and sunshine.
Plants and stale air and sunshine.
Petri dishes.
Places. Home and school.
Time. Day and night.
- IV. Food and drink.
Necessity.
A. Mastication.
Value of eating slowly and chewing thoroughly.
B. Clean food.
1. Need of washing fruit.
2. Danger of exchanging partly eaten food.
- V. Exercise and rest.
Value of exercise and rest.
Value of games assigned in the course of study.
- VI. Posture.
Especial need of children always having correct posture.
- VII. Eyes.
Importance of sight.
1. Danger from facing light.
2. Danger of using eyes in twilight or poor light.
3. Necessity of wearing glasses all the time.
4. Necessity of keeping glasses clean and properly adjusted.

Alcohol and Tobacco.

Alcohol — Unhappiness caused by the use of alcohol.

Cost: money used for alcohol could contribute to the comfort of the family.

Tobacco — 1. Not a clean habit.

2. Cost.

3. Effect on growth and scholarship of children.

Difference in instruction in lower and higher grades. Although forming health habits should be a fundamental aim in teaching younger as well as older children, the approach may vary somewhat in each case. A child on entering school, and for the first two or three years thereafter, can understand little of the scientific reason why he needs to act in a particular way. Although systematic instruction would be fruitless, children may be taught to have right attitudes toward certain health problems and to act correctly. For example, children brought up in a home where the fly is regarded with disgust and is promptly exterminated whenever found in the house, early assume the same emotional attitudes and modes of behavior. I have seen children less than three years of age who showed great irritation when a fly buzzed around their food. It would be impossible, of course, to explain to a child some of the scientific reasons why flies should be killed. The gaining of such information at this time is also quite unnecessary. But the teacher should strive, even with children just entering school, to get right attitudes and action. Every child with proper training in the school might get a feeling of disgust when asked to "swallow" gum or food or to drink from a cup that has been "passed around." The habits referred to on page 55, if not already acquired by children, should be begun at once. Much of this instruction must necessarily be incidental. A child that slouches in his seat may be told whenever the occasion arises that he would look so much better if he sat up: or a pale, anaemic pupil who has a tendency to mope indoors during recess may be encouraged to go outdoors to play. Although much of the teaching of hygiene to little children must be incidental, it should not be entirely so. For example, every child should get the habit of using a toothbrush as speedily as possible. Results will not be gained unless direct instruction is given. Little children

may be told quite simply about the need of having the teeth cleaned and daily inspection may be instituted. Direct lessons when given to little children should be short, simple, and made to appeal to some dominant interest. Many teachers find that some of the time devoted to morning talks may be used to advantage to instruct the whole school in regard to health. This would be especially desirable when some project like the use of individual drinking-cups is to be undertaken by the whole school.

Beginning at the age of nine or ten, the instruction, while still emphasizing incidental teaching, may be planned more systematically so that the child's natural curiosity about some things may be satisfied and the outlook as to health broadened. The work in the upper grades should provide for careful training in emergencies and a careful study of the ways in which disease is transferred with special reference to the problems of the community. Community hygiene should always be considered in relation to citizenship.

Training in emergencies. The ability to meet a serious emergency effectively depends on one's *training* to do the right thing at the proper time. Every boy and girl in our public schools should be trained to give first aid. If possible a textbook, like Gulick's *Emergencies*, should be placed in the hands of all the older pupils. The teacher should at least possess such a volume.

The child's love of action may now be used to advantage. Children may be taught to make bandages, apply them to make-believe wounds, carry a companion assumed to be injured, etc. There is, however, a more practical aspect. Children at school are likely to have cuts, burns, sprains, bruises, slivers, dirt in the eyes, etc. Under such conditions there is usually no hygienic treatment at the school. In the case of a cut, at the risk of infection a soiled rag or handkerchief may be wrapped around the wound to stop the

flow of blood. Under such conditions the class training in emergencies should be useful. An emergency outfit ought to be at hand so that the children with the aid of the teacher may treat the case themselves. These outfits may be secured or at least ordered through any drug-store, but if the teacher wishes to get along at a minimum expense, she may easily collect the necessary drugs and materials at slight cost. I would suggest the following as being almost indispensable:

Pins, common and safety.

- 1 dram bottle oil of cloves (for toothache; a drop on cotton in cavity).
- 1 pair scissors.
- 1 small package of absorbent cotton, bandages (may be bought at the drug-store or loosely woven pieces of clean cloth may be brought from home by the children).
- 1 roll of surgeon's plaster.
- 1 small bottle of carron oil (for burns).
- 1 package of borax (for gargle).
- 1 half pint of witch hazel (for sprains), quarter of a pound of Creolin (Pearson's), one teaspoonful in one pint of water makes antiseptic solution.
- 1 oz. boracic acid (eye wash).

Such material should be kept in a covered box out of the reach of the little children.

Emphasis on health rather than disease. It is a mistake for the teacher to dwell on disease, its symptoms and mortality. Such information tends to promote morbid states of mind and often, especially with younger children, defeats the true ends of health education. As a people we are still very wasteful and inefficient because we pay too little attention to matters of health until sickness or accident overtakes us. Then we go to the physician to effect a cure, often when it is too late. It is an old-fashioned saying, the truth of which, I believe, has never been questioned, that "an

ounce of prevention is worth a pound of cure." It is the business of hygiene to furnish this ounce of prevention; its purpose is to prevent disease, to make the body and mind so healthy that the doctor may be less and less necessary. To accomplish this it is not necessary to make a detailed study of symptoms and mortality. If the teacher can get children to form good health habits, disease will be less prevalent. Let the teacher talk health and the happiness it brings!

Hygienic instruction during epidemics. In hygiene, as in all subjects of the curriculum, it is always desirable to consider problems that have current interest in the community. If measles, scarlet fever, or diphtheria break out, the interest in the prevention of these diseases will be naturally at a white heat. Here is the teacher's opportunity. At the parent-teacher meetings she may discuss the symptoms of the disease, how it is spread and how to coöperate with the teacher in the care of the children's health. The course of study in hygiene should not be so rigid that it cannot be modified to meet such an emergency. Principles of hygiene may now be presented to pupils effectively. Suppose that a pupil in school should become ill with diphtheria. Then is the time, says Dr. Royer, "to impress upon pupils how the germs are spread from the mouth of the individual and how the droplets of moisture carrying thousands of germs are thrown off in coughing or sneezing; then is the time to make pupils see that these germs may be readily transferred from lip to lip, from mouth to pencil or book, from the moistened finger of the pupil to the printed page, etc. And so with scarlet fever, tonsillitis, or *impetigo contagiosa*, the lesson of infectiousness by close personal contact, by the use of common towels, by kissing or the exchange of food-stuff, the swapping of gum or cores — a chance, if properly utilized, is presented to leave impressions that will never be

forgotten." Such instruction with reference to a particular disease is valuable also for the prevention of disease in general. It reinforces instruction previously given and may contribute powerfully toward the inculcation of important habits.

In connection with the spread of disease both *parents and children should be told explicitly of the danger of personal contact and the possibility of a healthy person carrying the germs of disease.*

First-hand study of health problems. Most instruction in hygiene is altogether too bookish to be effective. It begins with the reading of a book and ends there. As a means of cultivating interest and acquiring clear ideas, the teacher will find the method of studying concrete problems before using the textbook highly desirable. For example, the care of milk is highly important. Instead of getting children to read what may be found in the textbook, it would be better to visit some model dairy in the vicinity. If it is impossible for the teacher to go with members of the school, some of the pupils might go and report orally or by means of a composition what has been learned. The subsequent reading and discussion would then prove much more interesting and profitable. Many concrete problems of personal hygiene and the health of the community may be helped toward a solution by actually getting children to do something to improve their own health and the sanitation of schoolroom and grounds. Such practical work is destined to reach the homes. Rural communities need to have examples presented to them in concrete form.

Keep a record of the health achievements of every child. To make health education really effective, to focus attention on every child, the teacher should keep a brief but accurate record of the improvement every child makes in his own health. This record might be kept in any kind of

notebook, preferably in one with covers. The ordinary manilla-covered composition book, which sells usually for five or ten cents, would serve this purpose admirably. One or two pages might be reserved for each child.

Here are selections from one of the better records of a child of twelve:

JENNIE WILSON

- Oct. 1. Teeth very dirty and several are decayed. Hands clean. Bad posture. Anæmic.
- Nov. 10. Is learning to use toothbrush. Teeth are cleaner. Bad posture continues. Plays more at recess.
- Dec. 15. Complains of toothache. Continues to clean teeth regularly. No improvement in posture. Lips still pale.
- Jan. 15. Met Jennie's parents. As a result J. was taken to a dentist and her teeth were filled. J. is trying to play more in the open air. Parents seem inclined to help.
- March 15. Keeps her own health record with care. Teeth cleaner. Has much more color. Appreciable improvement in posture.
- April 5. J. has helped the teacher to organize games. Spends more time in the open air. Continues to improve slightly in posture.
- May 15. *Summary for the year:*

J. has had her teeth filled, has learned to use a toothbrush and is keeping the teeth clean. Less anæmic. Posture improved but still poor.

Suggestions for next year.

Her growing interest in outdoor games and sports should be encouraged. Would encourage her to try to get a good posture pin.

In the case of the older children, the records might be made by each pupil himself with the help and approval of the teacher and the other members of the class. Such a book would then be subject to the inspection of every member of the class. Each pupil would thus be interested in see-

ing his own record improve, and also to compare favorably with his classmates. The keeping of such a book should be a part of the regular class-work, not only for the sake of the teacher who might be burdened with extra clerical work, but also in the interests of the pupils themselves. Such a plan if organized intelligently and tactfully by the teacher would make corrective work what it should be — an important aspect of all health education.

Keeping a record of the health achievements of classes and the school. Space should also be reserved in the book we have mentioned for the health achievements of the class as a whole. In the more advanced class containing the older boys and girls we should expect many of the school projects to originate. This class should, of course, lead the school.

The following is the type of record we should expect such a class to have:

WHAT OUR CLASS DID IN THE INTERESTS OF HEALTH

Sept. 20. We decided that we should not be content to merely read and talk about hygiene; we should also do something for the welfare of our school and our own homes.

Oct. 1. We have just finished reading about drinking-water in our textbook. A study of the drinking-water in our school shows that we are doing several things dangerous to our health. The pail used for drinking-water has no cover, and we all drink from a common cup. Nobody knows when the pail was washed.

Oct. 15. Jennie Wilson, who lives near the schoolhouse, took the water pail home and gave it a good scrubbing. Sam Bacon brought a cover for the pail. Our teacher taught us to make paper drinking cups. It was fun to make them, but we found it difficult to keep a supply on hand and the smaller children used to drink sometimes from the same cup. It was decided finally by the class to ask every pupil in the school to bring a drinking-cup from home. Before

this was done we had a talk about where these cups should be placed so that they could be kept clean and free from dust. Fred Barnes suggested that a little cupboard be made so that every cup might be hung on a nail with the pupil's name written on a slip of paper pasted below. During the sweeping and when the cupboard is not used, the door is to be closed.

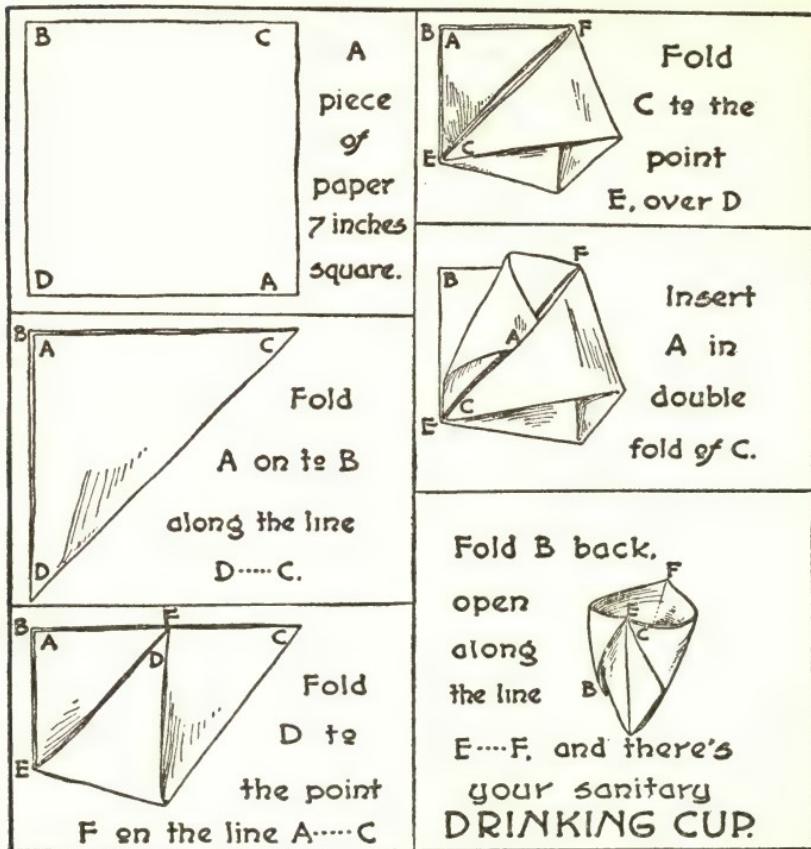


FIG. 10. HOW TO MAKE A PAPER DRINKING-CUP
(Courtesy of Department of Health, City of Chicago.)

Oct. 20. In our arithmetic class we planned our cupboard. John Jones, who likes to draw, made a drawing of it. Two boys in the class volunteered to bring the neces-

sary pieces of board, and others brought hammer and nails. The cupboard was finally made. Mr. Doan, the director of our school, was pleased to see it. We also took up a collection of a few pennies from every pupil in the class to purchase some paint to paint the cupboard.

- Nov. 10. To avoid dipping our cups into the water pail Sarah Brunnell brought a pitcher with a cover. We pour the water into the pitcher and then into the different cups.
- Dec. 1. Some of the children drink out of each other's cups. The school at our suggestion has appointed a board of health consisting of William Brown, Annie Green, and Joe Sobiskey to see that each child uses his own cup. Everybody in the school is pledged to use his own cup and never that of any other child.
- Jan. 30. The board of health reports that it is very seldom that any pupil is seen to use another child's cup. Nobody has been observed to do this for three weeks. Our textbook says that we must have good habits to be healthy. We think this habit of using an individual cup is a good one and we feel that we have practically mastered it.
- March 1. Our school has no play apparatus. We have decided to make parallel bars and a teeter-board.
- April 1. Our play apparatus is made. The boys brought most of the material from home. It was made mostly after school. Mr. Radcliffe, at whose house the teacher boards, and three of the neighbors turned in to help the boys late one afternoon. In addition to what was planned we have a sandbox.
- April 10. We have just been studying what Dr. Hutchinson says about the house fly as a cause of disease.
- April 12. Some of the children have brought netting from home and we have tacked it over the windows. The door must wait until next year, but we are going to try to keep it closed. Every pupil in the class has made a fly "swatter" or a trap. Two of the traps have been put near the schoolhouse door, and we have caught many flies. The other fly-traps have been used at home. Silas Green reports that he made a trap for John Haist and received 50 cents.

We feel that we have "done our bit" to get rid of the flies as Dr. Hutchinson would have us do.

- June 1. We had an entertainment last night and cleared \$12.00. We have ordered from the N.W. Supply Co., Minneapolis, Minn., a bubbling drinking-fountain which is to cost \$9.00. We can hardly wait till it comes. We believe a drinking-fountain is much more sanitary and convenient than using individual cups.
- June 12. Mr. Taft, the superintendent of the rural schools of this county visited our school to-day, and we showed him our new bubbling drinking-fountain, our home-made play apparatus and our fly-traps and screened windows. Mr. Taft says we have done the best health work of any school in the county; and that means a good deal, for Christopher County is one of the largest in the State.

We are going to do just as well, if not better, next year.

On the last day of school the teacher, or, better still, some of the older pupils, might well tell about the achievements of the school along the lines of health. This will help to enlighten the community as to health and the work of the school; it will also tend to put a premium on actual accomplishment in health conservation and improvement. From such a beginning the school, even under the leadership of another teacher, ought to continue to make progress.

Health rules for school-children. Dr. Thomas D. Wood, representing a committee of eminent educators and authorities on educational hygiene, has formulated "Ten Golden Rules of Health for School-Children." They are so fundamental and so admirably expressed that every teacher should know them. They are particularly valuable as showing the teacher what is most important in training children in matters of health. Mimeographed copies should be put into the hands of the older children. If this is impossible they might be copied into their notebooks from the black-

board. Each rule should be discussed in class. The teacher ought also to use every effort to follow up the children so far as practicable, to see that these rules are actually translated into life. The rules are as follows:

1. Play hard and fair — be loyal to your team mates and generous to your opponents.
2. Eat slowly. Do not eat between meals. Chew food thoroughly. Never drink water when there is food in the mouth. Drink water several times during the day.
3. Brush your teeth at least once a day. Rinse your mouth out well with water after each meal.
4. Be sure your bowels move at least once a day.
5. Keep clean — body, clothes, and mind. Wash your hands always before eating. Take a warm bath with soap once or twice a week; a cool sponge (or shower) bath each morning before breakfast and rub your body to a glow with a rough towel.
6. Try to keep your companions, especially young children, away from those who have contagious diseases.
7. Use your handkerchief to cover a sneeze or cough and try to avoid coughing, sneezing, or blowing your nose in front of others.
8. Study hard — and in study, work, or play do your best.
9. Sleep: Get as many hours in bed each night as this table indicates for your age. Keep windows in bedroom well open.

<i>Hours of Sleep for Different Ages</i>	
<i>Age</i>	<i>Hours of Sleep</i>
5 to 6	13
6 to 8	12
8 to 10	11½
10 to 12	11
12 to 14	10½
14 to 16	10
16 to 18	9½

10. Be cheerful, and do your best to keep your school and your home clean and attractive, and to make the world a better place to live in.¹

¹ From *Health Essentials for Rural School-Children*, prepared by Dr. Thomas D. Wood.

Learning a health creed. It is believed by many teachers that the reciting by children of the words pledging allegiance to the flag helps to cultivate a spirit of loyalty and an ideal of American citizenship. The recital of a health creed is also believed to encourage health habits and hygienic ideals. It is easy to exaggerate the importance of such a method. Habits are not usually formed with such ease. However, it is probably true that the enthusiastic teacher may in this way keep before children the fundamental goals of health and cultivate an interest and enthusiasm which may prove helpful. The teacher who uses such a creed needs to be reminded, however, that "lip service" does not necessarily imply effective health education.

The following inspiring creed for boys and girls was recently issued by the Massachusetts State Department of Health:

MY BODY IS THE TEMPLE OF MY SOUL

Therefore:

I will keep my body clean within and without;
I will breathe pure air and I will live in the sunlight;
I will do no act that might endanger the health of others;
I will try to learn and practice the rules of healthy living;
I will work and rest and play at the right time and in the right way, so that my mind will be strong and my body healthy and so that I will lead a useful life and be an honor to my parents, to my friends and to my country.

The ideal farm. The older children should get some definite concepts as to the health conditions that should prevail on a farm. The teacher may get a good idea of these essentials by looking over the points considered in the survey of the four Indiana counties described on pages 17-18. Phases of ideal farm conditions may sometimes be found in the neighborhood of the school. Pictures and lantern slides may always be used to advantage, but in the absence of all these an ideal farm, including model health conditions, may

be admirably represented in a sand box. This should be a project for the more advanced classes or for the entire school. Such a method never fails to arouse interest and it insures clear and definite ideas.

Use of pictures and lantern slides. In most of the rural districts the achievements in hygiene and sanitation have been so meager that there is little to observe at first hand in the way of ideal sanitation. Such deficiencies may be supplied to a large extent by the use of pictures and lantern slides. One of the advantages in the use of such material is the possibility of presenting examples of both bad and good sanitation. In a region where the ideal barn is unknown, pupils through the use of pictures may get a definite idea of each. Teaching through contrasts in this way excites interest, leads to clear understanding, and helps pupils to get right standards.

The plea of expense is no adequate excuse for not using pictures in teaching hygiene. Everybody in general reading of magazines and newspapers comes across pictures that illustrate various phases of hygiene. Even the advertisements in magazines may often be utilized in lessons on the teeth, posture, etc. Excellent pictures are often available in Government documents and health reports. All pictures that may be used should be classified and put into envelopes so that they are readily accessible.¹

The stereopticon is invaluable as a means of instruction. The pictures are not only larger and clearer than the ordinary kind that can be secured, but they can be seen by teacher and pupils at the same time. A stereopticon is not only valuable for class-work, but also for community enter-

¹ The stereoscope is now rapidly coming into use in the teaching of various subjects. The Keystone View Company, Meadville, Pennsylvania, can furnish a good stereoscope and some excellent pictures on health habits and sanitation. Dr. M. V. O'Shea has just listed a portion of their well-known "606 Set" with special reference to health habits.

tainments and parent-teacher associations. The lack of electricity in a schoolroom need be no objection to buying a lantern, as an acetylene burner may be used effectively. Stereopticons suitable for use in the classroom are now so reasonable in price that almost any enterprising teacher may secure one by giving school entertainments to which a small admission may be charged. In purchasing a lantern teachers should be careful to secure a machine which is moderate in price, portable, and simple in adjustment.¹

After the lantern is purchased, the slides may be obtained a few at a time as the money available warrants. If the parents in a district become interested there will be little difficulty in adding to the collection as they are needed. The possession of a lantern often makes it possible to invite talent that could not otherwise be used. Often a physician or a member of a board of health who resides near by may be persuaded to show some slides and give a lecture to the school or the community on some health topic. A lantern may be used with equal advantage in showing slides on topics other than health. Slides may often be lent or rented from boards of health, State normal schools and agricultural colleges. Slides on various health topics such as posture, the milk and water supply, the fly and mosquito problem, etc., may be secured from the Educational Exhibition Company, Providence, Rhode Island, and Keystone View Company, Meadville, Pennsylvania.

Compositions on health. Among the older children the

¹ The writer has used in his own classroom for some time a balopticon manufactured by the Bausch & Lomb Optical Company, Rochester, New York, and has found it very satisfactory. An investigation by the author of their line of lanterns shows that they are well prepared to fill the needs of the ordinary teacher in the rural schools. Teachers who are interested should write to the above-mentioned firm or some other manufacturing concern of proved reliability for a catalogue. It is often a good plan to write to the manufacturers or dealers stating just what your needs are so they can advise accordingly.

writing of compositions may be useful in giving the teacher a good idea of the habits of the children or what information children have gained from certain reading or observation. If children were called upon to write on "What I do to prevent colds," or, "What I saw at a model bakery," the teacher would get some information herself as to the habits and observation of the children which might play an important part in her future instruction. When compositions are carefully planned by the teacher, they may also be a means of inspiring children to be more observing or to do something worth while to record in their compositions. The following is an incomplete but suggestive list of topics for compositions:

1. How we can improve the sanitation in the country.
2. What this school is doing to exterminate flies.
3. How we earned the money to buy screens for our schoolhouse windows.
4. The value of clean milk and how it may be produced.
5. Ideal health conditions on a farm.
6. Danger from rats and how we may get rid of them.
7. Why we should sleep with our windows open.
8. What I saw at a model dairy.
9. Some good health habits and how they may be formed.
10. How I have improved in health through the practice of hygiene.
11. The value of clean hands.
12. Why athletes do not smoke.
13. What our school has done to make the schoolhouse and grounds a better place in which to live.
14. Why it is dangerous to drink from a spring.
15. Why I keep my teeth clean.

Free printed matter on health. So rapid, indeed, are the developments in the field of hygiene that many facts in even the advanced and recent textbooks become obsolete in a short time. The teacher who desires a broad background must depend on information beyond that found in the chil-

dren's textbooks. Reference books for teachers are desirable, but not always available. Helpful libraries are often inaccessible. Fortunately there is a large amount of reliable printed matter on health which can readily be gathered with little or no expense. As the vast majority of rural school teachers are possibly unaware of the existence of much of this material, the ease with which it can be secured, and the uses to which it may be put, a somewhat detailed discussion of "free materials" may prove helpful.

The prospective teacher or the teacher in service will find it profitable to begin to collect pictures and printed matter on health at once. Much of it may be collected with ease. One source of supply within the reach of all teachers is the newspaper and popular magazine. While such material is not always authentic, much of it is valuable, and, if properly used, stimulating. The following magazines often have good articles on health: *Good Housekeeping*, *Ladies' Home Journal*, *The Woman's Home Companion*, *McClure's Magazine*.

If the school is to be efficient it should deal especially with the health problems of the pupils' own environment. A general observation on the part of the teacher, coupled with good sense, is worth while, but information more accurate scientifically is frequently available. The report of the local board of health is often printed and may be secured free by applying to the secretary of the board. Many of our State boards of health publish monthly bulletins which not only give a review of the conditions of their respective States, but often have popular scientific articles by health experts. All bulletins and reports of these State boards of health are free to all teachers. To be certain of getting these valuable bulletins as soon as published, it would be well to write to the secretary of the State board of health stating that you are a teacher and ask to be put on the mailing list. Bulletins relating to health are often issued by the State boards of agri-

culture and the agricultural colleges. In practically every State the State boards of education now prepare bulletins on health for the special use of teachers. An investment of a few cents in postal cards will usually bring valuable returns in the form of many useful bulletins. These bulletins are likely to be broad in their scope, but they will invariably give information about epidemics, how prevented and controlled, the most recent advances in medical science; also many practical hints on how to keep well.

Many valuable documents on health may also be secured free from the following bureaus and departments of the United States Government, Washington, D.C.: Bureau of Education, Department of Agriculture, Public Health Service, and the Department of Labor. A certain number of these pamphlets when first issued are free. When this free supply is exhausted, they may be purchased as long as they last for a nominal sum from the Superintendent of Documents, Washington, D.C. A catalogue of these publications will be sent on application. These documents cover a very wide field, including such topics as child welfare, foods, pure milk, sewerage, flies, rats, mosquitoes, etc.

In addition to these governmental sources of supply there are many medical societies, insurance companies, and other reliable concerns that publish bulletins on health which may be secured free or for a nominal sum. A list of the names and addresses of some of these organizations follows:

Metropolitan Life Insurance Company, New York City.

The International Harvester Company, Chicago.

The American Social Hygiene Association, 105 W. Fortieth Street, New York City.

The American Medical Association, Chicago.

Boston Association for the Relief and Control of Tuberculosis, 4 Joy Street, Boston.

Health Education League, 8 Beacon Street, Boston.

Playground and Recreation Association of America, Madison Avenue New York City.

American Society for the Control of Cancer, 289 Fourth Avenue, New York City.

Bureau of Educational Experiments, 16 West Eighth Street, New York City.

National Committee for the Prevention of Blindness, 130 East Twenty-second Street, New York City.

American Picture League, Madison Avenue, New York City.

The Health Education League of Boston, Massachusetts, publishes a number of booklets on health subjects which should be useful to teachers. They are untechnical in language, prepared by the very best authorities, and sold at nominal prices. A list of these publications follows:

1. *Hints for Health in Hot Weather.* 2 cents; \$1.50 per hundred.
2. *Milk.* Charles Harrington, M.D. 3 cents; \$1.50 per hundred.
3. *"Colds" and Their Prevention.* 2 cents; \$1.50 per hundred.
4. *Meat and Drink.* Ellen H. Richards. 3 cents; \$2.50 per hundred.
5. *Healthful Homes.* 4 cents; \$3 per hundred.
6. *The Successful Woman.* William R. Woodbury, M.D. 4 cents; \$2.50 per hundred.
7. *The Boy and the Cigarette.* H. Sterling Pomeroy, A.M., M.D. 5 cents; \$3 per hundred.
8. *The Care of Little Children.* R. W. Hastings, M.D. 4 cents; \$3 per hundred. (Especially good for seventh- and eighth-grade girls.)
9. *The Plague of Mosquitoes and Flies.* 4 cents; \$3 per hundred.
10. *Tonics and Stimulants.* Ellen H. Richards. 2 cents; \$1.50 per hundred.
11. *Emergencies.* Marshall H. Bailey, M.D. 10 cents; \$6 per hundred.
12. *Microbes Good and Bad.* Anne Rogers Winslow. 4 cents.; \$3 per hundred.
13. *The Efficient Worker.* Ellen H. Richards. 4 cents; \$2.75 per hundred.
14. *Sexual Hygiene.* By an experienced physician. 4 cents; \$2.50 per hundred.
15. *Health in Labor Camps.* 3 cents; \$1.75 per hundred.
16. *Tuberculosis (Consumption).* Edward O. Otis, M.D. 5 cents; \$2.50 per hundred.
17. *When to Call the Physician.* George W. Gay, M.D. 4 cents; \$2.50 per hundred.
18. *Habits of Health.* Paul W. Goldsbury, M.D. 4 cents; \$2.50 per hundred.
19. *Wastes and Their Disposal.* Henry J. Barnes, M.D. 4 cents; \$2.50 per hundred.
20. *Typhoid Fever, Infection and Prevention.* Mary Hinman Abel. 5 cents; \$3 per hundred.

21. *The Observance of Health Day in Schools.* Thomas F. Harrington, M.D. 4 cents; \$2.50 per hundred.
22. *Industrial Hygiene.* Prof. C. E. A. Winslow. 7 cents; \$4.50 per hundred.
23. *Hygiene for Workers.* Bulletin no. 1. 6 cents; \$4 per hundred.
24. *Hygiene of Exercise.* Anna Leonard Muzzey. 5 cents; \$3 per hundred.
25. *Nerve Waste.* George Van Ness Dearborn, M.D. 7 cents; \$4.50 per hundred.

Through the expenditure of a small sum for postage and a slight amount for some bulletins that are not free, the teacher will be able to keep abreast of the best thought on hygiene, and much of the material she will be able to use in the school.

Pamphlets and illustrative material when collected by the teacher should be classified and manipulated so that they may be easily referred to. One of the best methods is to put materials into good-sized manilla envelopes labeling them "flies," "mosquitoes," "milk," etc. Every rural school should have a bulletin board¹ on which the children may be encouraged to fasten clippings, etc.

When the teacher is about to take up a given topic, she will find it helpful to refer to her materials, to find illustrative material or possibly printed matter and tack it on the board. In connection with the discussion of the house fly, for example, there are many illustrations and terse sayings that children would find interesting. No matter what the character of the lesson, the teacher may find something in her envelopes to enrich the lesson. If the class is considering the danger of the contamination of the milk-supply, it should be a simple matter to refer to published data relating to the State or possibly the county or town in which the children live. Unless children are led to think of hygiene as

¹ If the schoolroom is without a bulletin board, the resourceful teacher may easily secure one that will answer the purpose temporarily. Ask the children to bring the largest pieces of cardboard they can find; fasten them to the wall. Let the children also provide tacks to fasten clippings.

dealing with problems near at hand, they may get the idea that it does not especially concern them.

A collection of materials referred to may also be useful in educating parents. If there are parent-teacher associations, the teacher may find plenty of material for talks or the parents may be invited to use the material. Every library of pamphlets should contain some useful information on child welfare. So far as possible the teacher should let the people of the community know that she has such material and encourage them to make use of it. The teacher may find it profitable also to collect pamphlets on other topics such as agriculture.¹

Planning a health day. In some States a day has been set apart by the legislature or by a proclamation of the Governor for the special consideration of health problems. In Michigan, where this movement seems to be well under way, many towns make a special effort during this week to get lectures, exhibits, moving pictures, etc., to further the war against disease. The schools throughout the State are expected to do something distinctive on this day to further the cause. This is a splendid opportunity for the teacher to profit by this community enthusiasm and ambition. It is easier to give instruction in the schools when there is cordial approval of the teacher's efforts by those high in authority and by the community. The observance of this day by rural communities is likely to pass with little or no demonstration unless the teacher assumes leadership. Here is an unusual chance to educate children, parents, and the community. Whenever there is a State observance of "health day" or "health week," the teacher should make a special effort to do something effective, something that will involve the coöp-

¹ Among the requirements for an approved rural school in Missouri is this, that the school library must contain at least fifty agricultural bulletins (free).

eration of the pupils and possibly of the parents. To make such a celebration worth while it would be wise to plan for it early in the year. Some way must be found to get parents to visit the school. If the teacher can get the children really interested, there will be no difficulty in getting parents and other members of the community to attend. One of the best ways to arouse interest is to get the children to do something. There might be an exhibit of hygienic devices which the children have made, such as fly-traps, fly—"swatters," paper drinking-cups, etc. Then the free publications carefully classified might be arranged for inspection. Some of the children might act as guides for visitors. If they are allowed to wear ribbons or badges, it will add to the interest. The school-grounds should be clean and orderly. There might also be some kind of program. Games, dances, and gymnastic exercises are always appreciated by older people. Some of the children could read essays telling about the progress the school had made in matters of health and what it was trying to accomplish. Many of the health records and essays might be exhibited on the wall. Some of these essays would probably be accepted for publication in a local newspaper. Such a public occasion would be stimulating and educative for pupils and community. It would be necessary, of course, to modify the program from year to year. In anticipation of such an event, the work of the school in hygiene might have a little different emphasis each year. The course of study needs to be flexible enough to permit necessary changes.

Textbooks for children. Usually the teacher is compelled to use the textbooks in physiology and hygiene that are found in the school, regardless of their merit. Many of these books are likely to be old and pedagogically unsound. The emphasis may be put on anatomy and physiology to the exclusion of the most vital topics in hygiene. If the teacher

stays long enough in a particular school to gain the confidence of the school board, she will be able to change these books. This ought to be done eventually by all means, but at the beginning she will find it necessary to get along as best she can. The progressive teacher will not follow a textbook slavishly just because it has been adopted and used. The most unprogressive textbook in use is likely to have certain chapters or paragraphs that can be used; the remainder of the book may be disregarded. The teacher should plan her course so as to emphasize the most important matters in health. Possibly the school board might be induced to buy a few reference books for the school. But no matter what the situation may be, the teacher will find enough concrete problems connected with the schoolhouse and grounds and the habits of children to do excellent work. She may wait until later for the textbooks.

The textbooks chosen should be simple in language, interesting to children, and devoted to practical health problems with only such reference to physiology and anatomy as is necessary to understand the hygiene. Some excellent books are now on the market. The following series are especially commendable:

Woods Hutchinson Health Series. Houghton Mifflin Company, Boston.
Gulick Hygiene Series. Ginn & Co., Boston.

Crampton's Hygiene Series. American Book Co., New York, Chicago.
O'Shea and Kellogg Health Series in Physiology and Hygiene. The Macmillan Co., New York.

New World Health Series. World Book Co., Yonkers-on-Hudson, New York.

Wiley's Health Series. Rand, McNally Co., New York.

Unfortunately there is at this time no book on hygiene for children dealing especially with rural health problems.

Supplementary books for children. It is quite exceptional to find supplementary books in hygiene in rural schools, but there is no question as to their usefulness. Frequently they

cover many topics not found in the regular textbooks, and although they may cover much of the same ground, the points of view, style, illustrations, etc., will be different so as to broaden and deepen the interest of the reader. Supplementary books should be placed on a reference shelf where they are readily accessible. The following books,¹ some of which have already been recommended in textbook series, would prove useful as supplementary books:

1. George O. Bussey. *Manual of Personal Hygiene*. Ginn & Co., Boston, 1917.

Presents concisely the fundamental facts that children ought to know about hygiene. Suggestive for both teachers and children.
 2. Walter Moore Coleman. *The Handbook of the People's Health*. The Macmillan Co., New York; pp. 307.

General hygiene, profusely illustrated, attractive style, refers to rural hygiene.
 3. Charlotte Vetter Gulick. *Emergencies*. Ginn & Co., Boston; pp. 173.

Tells just what to do in every ordinary kind of emergency. Invaluable in every rural school.
 4. Woods Hutchinson. *The Child's Day*. Houghton Mifflin Co., Boston; pp. 184.

An excellent book on general hygiene for younger children.
 5. Woods Hutchinson. *Community Hygiene*. Houghton Mifflin Co., Boston; pp. 310.

Shows how a helpful and co-operative spirit is the mark of good citizenship.
 6. Woods Hutchinson. *A Handbook of Health*. Houghton Mifflin Co., Boston; pp. 348.
 7. Frances Gulick Jewett. *Good Health*. Ginn & Co., Boston; pp. 174.

Attractive book for little children.
 8. Kinne and Cooley. *Clothing and Health*. The Macmillan Co., New York.
 9. Kinne and Cooley. *Food and Health*. The Macmillan Co., New York.
 10. Kinne and Cooley. *The Home and the Family*. The Macmillan Co., New York.
- A series of books on home-making. Invaluable for pupils and teachers.

¹ At the present time the prices of standard books fluctuate so that they cannot be definitely indicated. Books in the list recommended for children will cost from 50 cents to \$1.00; those for teachers, from \$1.00 to \$1.50.

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11. H. H. Moore. *Keeping in Condition*. The Macmillan Co., New York; pp. 137.

An excellent book on general hygiene for boys. Answers many questions about sex that boys are asking.
12. Josephine Morris. *Household Series and Arts*. American Book Co., New York; pp. 248.

A brief, simple, practical book on domestic science.
13. O'Shea and Kellogg. *Health Habits*. The Macmillan Co., New York; pp. 213.

A simple and direct presentation of the need of health habits and a detailed discussion of a large number of habits. Very good.
14. T. Mitchell Prudden. *Drinking Water and Ice Supplies*. G. P. Putnam's Sons, New York; pp. 111.

Tells of the conditions necessary for pure ice. For older children. Illustrated.
15. Florence Harvey Richards, M.D. *Hygiene for Girls*. D. C. Heath & Co., Boston; pp. 257.

An excellent book on hygiene for girls with a chapter on the physiology of the reproductive system.
16. John W. Ritchie. *Primer of Sanitation*. World Book Co., Yonkers-on-Hudson, New York; pp. 216.

An unusually good book on disease germs and how to fight them. Ought to be in every school either as a textbook or reference book.
17. John W. Ritchie and J. S. Caldwell. *Primer of Hygiene*. World Book Co., Yonkers-on-Hudson, New York; pp. 200.

Designed to teach the lower-grade pupil what he himself can do to keep his body in health. An interesting little manual on personal hygiene.
18. Arland D. Weeks. *The Avoidance of Fires*. D. C. Heath & Co., Boston; pp. 128.

Designed primarily for the use of city children, but contains many helpful suggestions for children in rural schools.
19. C. E. A. Winslow. *Healthy Living*. Chas. E. Merrill Co., New York.

One of the best of modern textbooks for older children.

Reference books for teachers. The teacher who wishes to achieve a marked success in her profession will form the habit of reading the latest and best books bearing on her work. If the teacher has access to a large city library during the year, she will be able to read many desirable books. Such an opportunity is, however, lacking to the majority of rural school-teachers. Few school boards as yet seem dis-

posed to buy such books for their teachers. The teacher who wishes to keep abreast of the best thought in regard to health will plan to invest money for a few professional books each year. One of these books ought to be a good book on practical health problems. Any of the following books will prove useful:

1. Ayres, Williams, Wood. *Healthful Schools*. Houghton Mifflin Co., Boston.
An excellent book on the hygiene and sanitation of the school plant.
2. Jessie H. Bancroft. *The Posture of School-Children*. The Macmillan Co., New York; pp. 322.
Almost indispensable to the teacher who intends to correct the bad habits of posture of her pupils.
3. Jessie H. Bancroft. *Games for the Playground, Home, School, and Gymnasium*. The Macmillan Co., New York; pp. 455.
The kind of book for the teacher who expects to teach boys and girls the best games.
4. Isaac Williams Brewer. *Rural Hygiene*. J. B. Lippincott Co., Philadelphia; pp. 227.
An interesting treatment of the health problems of the country.
5. Henry S. Curtis. *Play and Recreation for the Open Country*. Ginn & Co., Boston; pp. 265.
Special consideration of the problems of rural recreation. One part devoted to the play of the Rural School. Illustrated. Excellent.
6. Fletcher B. Dresslar. *School Hygiene*. The Macmillan Co., New York; pp. 369.
Particularly good on the sanitation of the school plant.
7. Fisher and Fisher. *How to Live*. Funk & Wagnalls. New York; pp. 345.
A superior book on personal hygiene written by experts.
8. T. W. Galloway. *Biology of Sex, for Parents and Teachers*. D. C. Heath & Co., Boston; pp. 105.
A temperate discussion of sex hygiene.
9. Luther H. Gulick. *The Efficient Life*. Doubleday, Page & Co., New York; pp. 195.
Personal hygiene, attractive style, carries conviction.
10. Hough and Sedgwick. *The Human Mechanism*. Ginn & Co., Boston; pp. 564.
Excellent reference for general physiology and hygiene.

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11. Woods Hutchinson. *Preventable Diseases*. Houghton Mifflin Co., Boston; pp. 442.
Popular, interesting, profitable for general reading.
12. W. W. Keen. *Medical Research and Human Welfare*. Houghton Mifflin Co., Boston; pp. 160.
A fascinating story of the achievements of preventive medicine in the last fifty years. Contains much material which the teacher could use.
13. Lewis M. Terman. *The Hygiene of the School Child*. Houghton Mifflin Co., Boston; pp. 417.
Latest information on the health of the school child.
14. Lewis M. Terman. *Health Work in the Schools*. Houghton Mifflin Co., Boston; pp. 321.
Contains helpful matter for the grade teacher.
15. Francis M. Walters. *The Principles of Health Control*. D. C. Heath & Co., Boston; pp. 476.
Differs from usual textbooks in hygiene in emphasizing corrective work. Full of excellent suggestions for teachers.
16. George Lincoln Walton. *Why Worry?* J. B. Lippincott Co., Philadelphia; pp. 269.
A popular and interesting treatment of a bad habit. Useful for any teacher, a helpful book to lend.

Other health problems connected with the course of study. This book does not attempt to plan the work in hygiene grade by grade. In the chapters that follow, however, the author has tried to call attention to the most significant health problems, and also to suggest ways in which these problems might be solved. In the last chapter (chapter XVII) an effort has been made to present in a nutshell the scope of health education, to evaluate the different kinds of health work so that the teacher may plan for definite results and pass judgment on the worth of her results.

CLASS EXERCISES

1. Make a study of the sanitation of some rural school and community. How would such information influence the content of any course of study you might make out?
2. Following the suggestions given in connection with the course of study

outlined for the fourth grade on page 95, plan work for the other grades or classes for a year.

3. Examine a series of children's textbooks in hygiene and in a written view of about one thousand words give your opinion with reasons as to whether they would be useful as textbooks for children in the rural schools.
4. Compare two series of textbooks as to content, method, and probable usefulness.
5. Make out a list of free publications in hygiene which you have found to be most useful.
6. What other books not mentioned on page would you suggest as supplementary books for children?
7. What examples of ideal health conditions do you find in your community or in the community studied? What field trips or excursions relating to health would be advisable?
8. Make out a definite program for the celebration of a health day in a rural school.
9. Make a supplementary list of topics suitable for compositions on health for grades 4-8, inclusive.
10. Write to your state board of health for free publications on the public health.
11. Look over all the magazines available to find illustrations which might be useful in teaching. Explain just how you would use them.

CHAPTER VII

THE WATER-SUPPLY AND SEWERAGE

Studies of the water-supply of farms both in Canada and the United States, show that sixty per cent of the wells are polluted with house and barnyard drainage. (*Dr. Charles E. North.*)

WATER is not technically a food, but it is an essential article of diet and a necessity for the proper cleanliness of person, clothing, and things. Because water is so plentifully and universally used by man and is contaminated with such ease, a pure water-supply is of fundamental importance to the health of any community. This problem cannot be solved, as this chapter will attempt to show, without securing proper sewerage.

The water-supply in the country inferior to that of cities. In the city the individual householder has little responsibility for the purity of the water-supply, as it is under the management of the municipal authorities. In the country, however, the situation is much different. The local boards of health and town and county authorities exercise little or no supervision over such matters. Every householder gets his own water as he sees fit, and upon his individual intelligence and care rests very often the health of the family and of the community. The surveys that have been made show that the majority of wells in rural districts are infected. This is doubtless one of the chief reasons why the death-rate tends to be higher in the country, for wherever the water-supply of cities has been improved, there is a notable decrease in the mortality, especially from typhoid. The elimination of wells from villages and the introduction of an improved water-supply inevitably lead to a more healthy community.

The menace to health from shallow wells,¹ springs, and insanitary privies. It is not pleasant to contemplate, but unfortunately it is true, that a large proportion of sickness and death is a result of taking into the body through the

¹ "The Old Oaken Bucket" has a place among our fond recollections, but it seems necessary to revise our sentiments somewhat to see it in relation to health. The following poem may seem a little extreme but there are many wells in America, although they are rapidly decreasing in number, that answer to this description:

THE OLD OAKEN BUCKET

AS SEEN FROM A SANITARY POINT OF VIEW

(From Bulletin of Kansas State Board of Health.)

With what anguish of mind I remember my childhood,
Recalled in the light of a knowledge since gained;
The malarial farm, the wet, fungus-grown wildwood,
The chills there contracted that since have remained.
The scum-covered duck-pond, the pig-sty close by it;
The place where the sour-smelling house-drainage fell;
The hut of my father, the barn-yard just nigh it,
But worse than all else was the horrible smell.

Refrain : The old oaken bucket,
The iron-bound bucket,
The moss-covered bucket,
That hung in the well.

Just think of it! Moss on the vessel that lifted
The water I drank in the days called to mind,
Ere I learned what professors and scientists gifted
In water of wells by analysis find.
The rotting wood fiber, the oxide of iron;
The algae and toads of unusual size;
The water impure as the verses of Byron,
Are things I remember with tears in my eyes.

Refrain.

How little I thought of the typhoid fever
That lurked in the water I ventured to drink;
But since I've become a devoted believer
In teachings of science, I shudder to think.

mouth human filth that has come directly or indirectly from some person who has or has had disease. Among the well-known diseases spread by human excrement are typhoid fever, dysentery, Asiatic cholera, tuberculosis, hookworm disease, and round-worm, eelworm, and tapeworm diseases. Germs of disease from human filth may be spread by flies and other insects, or by the water of an infected well, or by people who are negligent about washing their hands after coming from the toilet. One finds too often in the country a well which admits surface water in close proximity to a privy that pollutes the soil and contaminates the water of the well. Often, too, the drinking-water may be drawn from a spring or brook that contains drainage from some house or town.

The literature on the spread of disease is replete with illustrations of the dangers from infected wells. The investigation of a recent typhoid epidemic in Lansing, Michigan,¹ is interesting in this connection. A careful study was made of each case of typhoid reported. The conclusion was reached that it was not a milk-borne epidemic, as there was no great incidence of cases on the route of any one dairyman,

Perhaps I had boiled and afterward strained it
Through filters of charcoal and gravel combined,
And after distilling, condensed and regained it
In potable form with its filth left behind.

Refrain.

And now far removed from the scene I'm describing,
Emotions of grief large as tea-kettles swell;
My memory reverts to my youthful imbibing,
And I gag at the thought of that horrible well.

Refrain.

¹ Charles F. Lynch, M.D. "The Typhoid Epidemic in Lansing," *Public Health*, Lansing, Michigan.

and many of the cases had not used milk except as it had been obtained from cans for use in tea and coffee. A very careful analysis of the city water showed an entire absence

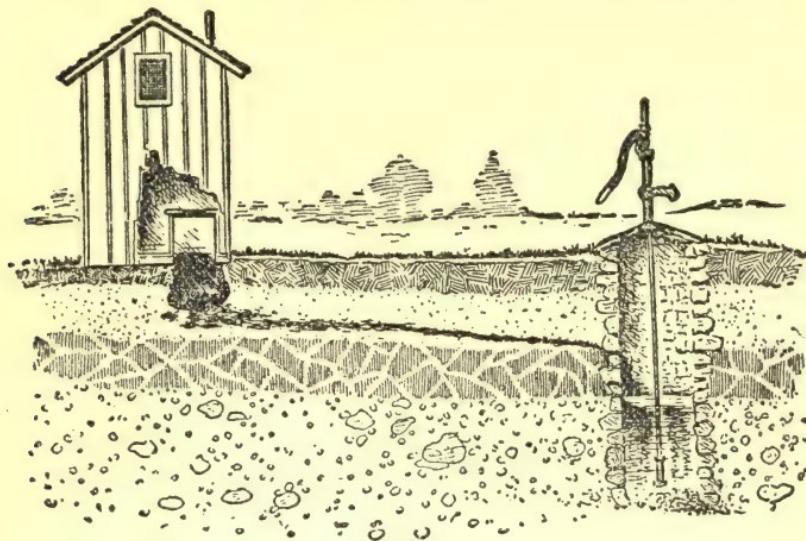


FIG. 11. POLLUTION OF A SHALLOW WELL BY SEEPAGE OF EXCRETA
DEPOSITED IN A PIT PRIVY

(Slightly modified from Minnesota State Board of Health. Courtesy of U.S. Public Health Service. From Public Health Bulletin No. 68.)

of bacterial contamination. The vast majority of the cases occurred in families that did not obtain their water from the city mains. The city of Lansing is divided into an east and west section by Washington Avenue. In the section west of Washington Avenue the homes are practically all supplied with city water. The sanitary conditions in this portion of the city are good. Outside closets and surface wells were almost entirely abandoned. In the territory east of Washington Avenue several hundred surface wells were still found in use and probably close to one thousand outside closets were still maintained. These outside closets were in a bad condition. In no case was a closet adequately screened from flies. In few instances had any of these closets been recently

cleaned and in many cases the vaults were practically filled to overflowing. Stables, large manure-piles, and an abundance of flies were to be seen in practically every block. An analysis of the water in many of these wells showed that many of them were badly contaminated. The results of this investigation indicated that contaminated wells, outside privies, and flies were responsible for the typhoid epidemic.

The epidemic at Lansing is typical of a great many throughout the country. The dangers from the shallow well, and the insanitary privy, both of which abound in country regions, are obvious. While the safe disposal of filth and the securing of pure water-supply are more difficult in the country than in the city, they are solvable problems.

In many States, especially in most of the Southern States, the lack of a proper disposal of bowel discharges is responsible for the hookworm disease, that most prevalent, most insidiously harmful, and most preventable disease known to humanity. The hookworm disease is due to the presence in the bowels of many small worms, called "hookworms," which cause the blood of the person who has them to become so thin and watery that it cannot nourish the bones and muscles as it should. Hookworm disease stunts the growth of children, saps their vitality, and makes them backward in school. A person who has the disease spreads it by allowing the bowel discharges to fall upon the ground for lack of a privy or by using one which is not properly made. These worms may enter the body by swallowing them in water or food that has been contaminated, but ordinarily they get in by boring through the skin with which they come in contact. Going barefoot over polluted soil is the method whereby the disease is usually contracted. Dr. Ferrell¹ says that in some rural schools investigated the records show "an average in-

¹ John A. Ferrell. *The Rural School and Hookworm Disease*. United States Bureau of Education, Bulletin No. 20, 1914.

fection among rural children of school age for whole counties running as high as seventy to ninety per cent. . . . The general average for all the children examined to date is forty per cent of infection." Yet this disease, which is so disastrous to the mental and physical condition of thousands of people, may be easily prevented by the construction and use of sanitary privies.¹

Insanitary conditions of the farm reproduced in the rural school. (a) *The school privy.* The deplorably insanitary method of disposing of human filth on the average farm is duplicated in the rural schools; for a community that is not sensitive about home sanitation is likely to be negligent of the sanitation of its schools. A joint committee of the National Council of Education and the American Medical Association report that less than five per cent of the toilets of one hundred and nine rural schools examined in Connecticut, New York, Vermont, Maryland, and New Jersey are sanitary or even passably decent. Dr. Dresslar, in his invaluable bulletin, *Rural Schoolhouses and Grounds* (United States Bureau of Education, Bulletin No. 585), describes one of these privies investigated:

One privy, typical of many, was fairly new, and the schoolhouse was not old. The privy was within three feet of the schoolhouse. When examined in the summer of 1913 by the field agent of the joint committee, the privy was used by both boys and girls; it had no partition; the door had no lock. Eleven obscene pictures were found on the inside. The feces fell on the surface of the ground and were exposed to flies; there was an offensive odor; and apparently no attempt was made to clean, deodorize, or disinfect the building. Many worse privies than this were found.

¹ Every teacher who wishes to find out the details as to how hookworm is contracted should write to the Rockefeller Foundation, New York City, for the free illustrated booklet, *The Story of a Boy Who Did Not Grow Up to be a Tall Strong Man*, or to the Metropolitan Life Insurance Company, New York City, for another free illustrated booklet, *Hookworm Disease and How to Prevent It*.

The results of this investigation are similar to those revealed by every survey of rural schools. There is one thing that makes a school even more dangerous than a home: it is a center by which disease may be disseminated throughout an entire community. Suppose, for example, that there is a district in which, by chance, there is no hookworm disease. The disease may be brought in by some of the children who have contracted the disease during a vacation in an infected region. Even a single case, if brought to a school where there was a lack of toilet facilities or an insanitary privy, might be the means of infecting an entire school and neighborhood.

Not only is the rural-school privy insanitary, but in many schools there are no toilet facilities at all. Such conditions were found in the survey of Porter County, Indiana, and in investigations in other States. This situation is due, of course, to the unhygienic habits of the home. The Rockefeller Sanitary Commission found as a result of a survey of 103,346 farmhouses in eleven Southern States that 50,637 of them have no privies at all. The danger from such procedure either at home or at school is incalculable. Soil polluted with human excrement may be carried on the feet of poultry, dogs, cats, rats, etc., to the well-top, the spring-bank, the yard where the children play, or into the kitchen, dining-room, or other parts of a private dwelling. Flies breed in such filth and infect everything they touch. Similar dangers confront the child in school who is forced to live in such surroundings.

(b) *The school water-supply.* It is seldom that the water-supply of a school is examined by a pathologist to determine its fitness for drinking purposes, but wherever this has been done the results are far from satisfactory. The source of the supply varies. Sometimes it is brought from the well of a neighboring farmhouse, from a near-by spring, or from a school well. Dr. Dresslar quotes in the above-mentioned

bulletin a letter from Dr. Kernachan, health officer of Lauderdale County, Alabama, as follows:

In making a survey of the rural school-children of this country recently, I collected a sample of the water supplied to each school. An examination of these specimens by the State pathologist reveals the fact that nineteen out of the twenty collected contained fecal matter.

Whatever the source of supply, results like these show a neglect of the most elementary principles of sanitation.

William J. Bray,¹ who directed a sanitary survey of the rural schools in twenty-six counties in the State of Missouri tells this harrowing story of the water supply:

Forty-two per cent have a living well as a source of water-supply; fifty-five per cent use a cistern, while three per cent use water from a spring. In seventy-seven per cent of the cases the water-supply is located on the school-grounds. Six out of ten schools have their water-supply within ten feet of the schoolhouse, while five per cent of the schools have to go more than five hundred feet for water. Forty-eight per cent of the teachers consider that their water-supply is not of unquestionable purity. The drinking fountain is found in twenty-five per cent of the schoolhouses, though in many cases the so-called drinking-fountain is merely a water-container with a faucet. The individual drinking-cup is used in sixty-four per cent of the schools, while the common drinking-cup is still passing the germs around in thirty-six per cent of the schools. The common bucket is used in thirty-nine per cent of the schools. More than one third of the wells and cisterns have board tops, while one sixth of them are so walled up that mice, rats, snakes and rabbits could get into the well or cistern. Only a few months ago a sample of water from one of these wells was sent to my laboratory for analysis. Upon my recommendation the well was cleaned out, and about two hundred snakes were found in the well. In another exactly similar case the well was found to have five dead rabbits in it. It is distressing to think of the many wells in school-yards the country over that are probably thus

¹ William J. Bray. *A Practical Application of School Surveys. Proceedings, American School Hygiene Association, vol. vi (1916), pp. 167-73.*

polluted, and no one takes sufficient intelligent interest to ascertain their suitability for drinking purposes. Eighty-six per cent of the cisterns are without any filters whatever.

Requirements for sanitary privy. If the outhouse is to be absolutely safe, it should be rigidly screened against flies, there should be a water-tight receptacle for the contents

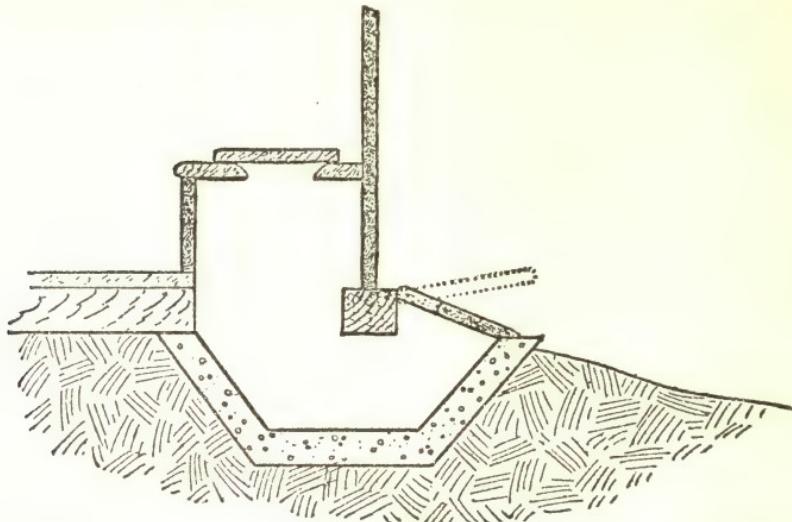


FIG. 12. A STATIONARY-RECEPTACLE SANITARY PRIVY WITH A CEMENT VAULT ARRANGED FOR CONVENIENT CLEANING. (ORIGINAL.)
(Courtesy of U.S. Public Health Service. From Public Health Bulletin No. 68.)

which should be frequently disposed of, and those who use the toilet should have cleanly habits. The ordinary school toilet in the rural schools has none of these qualifications. Usually it is a pit privy. This is essentially a hole in the ground over which the privy-house is built and into which the excreta are deposited. It may be open at the back so that it is freely exposed to flies and not far from the schoolhouse or well. When the pit becomes so full that it is mechanically impossible to use it for the purpose for which it was intended, a new pit may be dug and the building moved or the pit may be cleaned out.

While there is a possibility of a pit privy being built and managed with a minimum of danger, absolute safety cannot be guaranteed, especially when the schoolhouse is located on a small lot. There is always danger of contaminating the water-supply. Many rules have been given for regulating the distance from the privy to the well; but no general rule can be formulated because of the differences in the character of the soil and the dip of the impervious substratum of rock. For example, when there is a sandy soil with the underlying impervious rock dipping toward the well, pollution would be possible through a long distance, particularly in rainy weather. But if there were a clay soil with the impervious substrata dipping in the opposite direction, the well might be secure from infiltration even if the cesspool were a comparatively short distance from the well. The pit privy is particularly dangerous in marshy soil or limestone regions.

Space does not permit a detailed discussion of the different kinds of sanitary privies and the advantages and disadvantages of each. For such information the reader should consult some of the references given at the end of this chapter. Public Health Bulletin No. 68 says this concerning the disposal of the contents of the outhouse:

The removal and final disposal of the contents of a privy is necessary to keep a privy sanitary. This requires more work than does either the construction or the up-keep of the privy itself. It must be done systematically. People generally — and particularly those who do not understand the importance of the work — do not like to handle the material. Privies may be so constructed that final disposal occurs automatically through pipes which carry the overflow to the subsoil in such a way as to be safe or relatively so: or the receptacle can be made large enough (as a vault) so that it need not be emptied more than once a year; or it may be large enough (as a barrel) so that it need not be emptied more than once a month, if the family is not too large;¹ or it may

¹ This bulletin was intended for homes, but the principles set forth apply equally to schools.

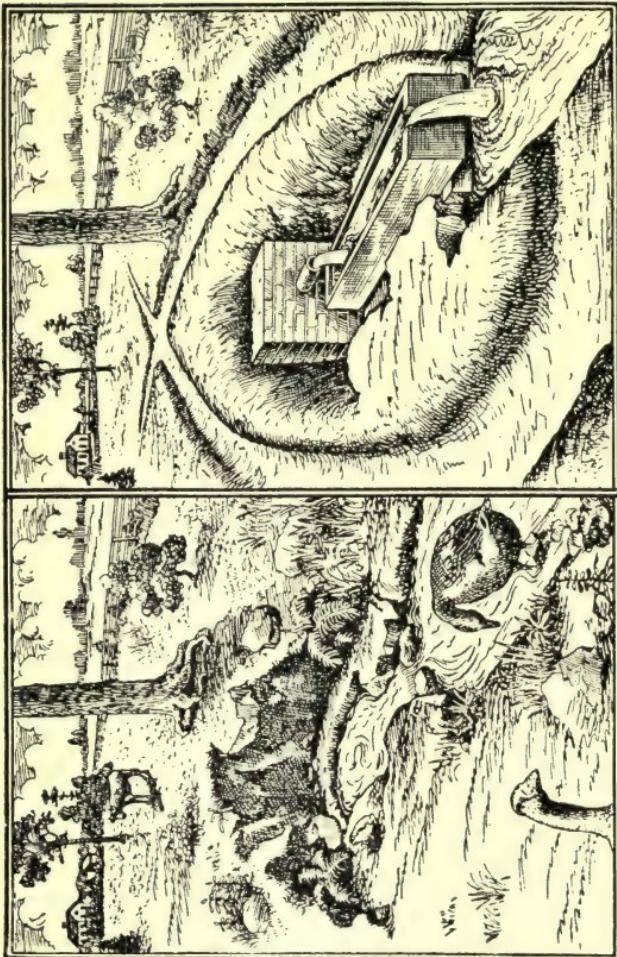
be of a size (as a pail) that requires emptying every week or every day according to the circumstances.

Requirements for sanitary water-supply. There is still a tradition among many people that water must be healthful if it is reasonably clear and palatable. They think that a well or spring is satisfactory if it meets those conditions. The truth is that neither the color of the water nor its taste is any sure indication of its purity; for even the clearest and most delicious water may be contaminated. Gerhard's observations here are especially interesting. He says:

Polluted well water is rendered more dangerous by the fact that it often has a bright, sparkling and clear appearance, and that in summer time it has a low temperature, making it particularly agreeable as a beverage. Only a chemical, microscopic and biological analysis can reveal its unwholesome condition.¹

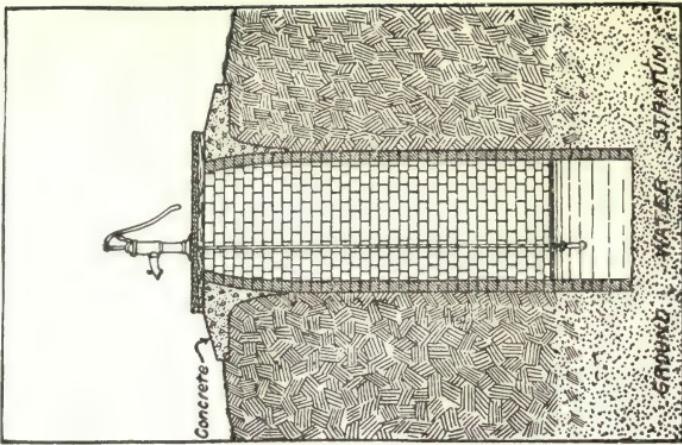
It is important to remember, however, that the possession of an original source of pure water does not insure its being conveyed to the consumer undefiled. On the ordinary farm or in the school-yard, even after the water is assuredly free of drainage from cesspools and is chemically fitted for use, there is a possibility of its being infected by the way it is kept, brought to the surface, and finally distributed to the members of a family or the pupils of a school. A single person may endanger the health of a family, school, or community by infecting a neglected well. Such a person might have the germs of typhoid or some other disease on his hands or shoes. He may handle the bucket of the well or drop some of the scrapings from his shoes into the well. In this way the life of every person who drinks the water is threatened. Even after the water is safely conveyed to some clean receptacle, disease may be transferred to somebody else through a common drinking-cup.

¹ Wm. Paul Gerhard. *The Sanitation, Water-Supply, and Sewerage Disposal of Country Houses*. Nostrand Co., New York.



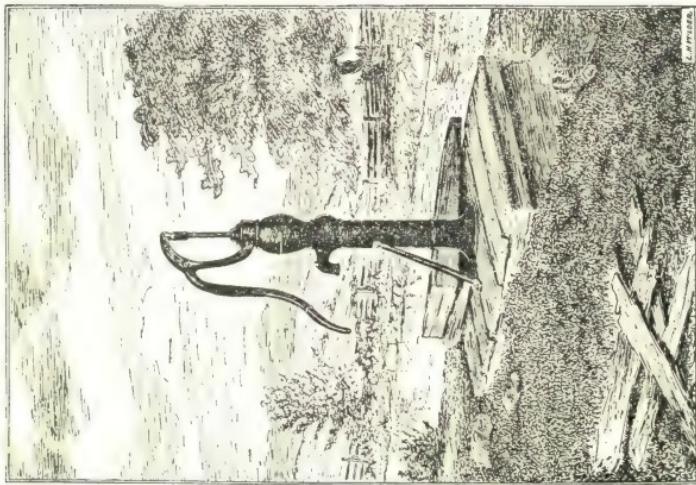
WHICH SUPPLY OF DRINKING-WATER IS SAFE?

(Courtesy of the State Board of Health of Virginia.)



WELL PROTECTED FROM SURFACE DRAINAGE

(Courtesy of the State Board of Health of Virginia.)



SCHOOL WELL SHOWING LACK OF PROTECTION FROM SURFACE AND WASTE WATER DRAINAGE — A MENACE TO THE SCHOOL AND COMMUNITY
(Courtesy of U.S. Public Health Service. From Public Health Bulletin No. 77.)

Dr. Bailey, in his sanitary inspection of the rural schools of East Tennessee and Northern Georgia, found many of the sources of drinking-water unprotected — a condition quite typical probably among rural schools. I quote from his report:¹

Drinking-water was supplied from dug and driven wells and springs, the most common source being the dug well, which as a rule is shallow, rarely exceeding thirty feet in depth. Most of the springs were unprotected from surface drainage or animal pollution and were not fenced off to prevent their use by cattle. While a number of the wells were brick or concrete, with concrete covers in good repair, the large majority of them were loosely covered with boards, usually in a bad state of repair and without troughs, allowing refuse water to drain freely into the well.

According to all sanitary surveys of farms and rural schools, keeping the water-supply pure is a serious problem. This may be accomplished according to the Virginia Health Bulletin (vol. ix, no. 6, June, 1917) by looking after these things:

1. The mouth of the well should be raised at least one foot above the surrounding soil. This may be done by elevating the wall to that height and sodding the soil around it, or it may be done by putting in a core of concrete around the top of the well in the manner shown in the illustration opposite page 134.

2. That part of the well extending above the ground must be so constructed that no water can wash through it into the well.

3. The surface of the well must be covered with an absolutely waterproof flooring which will extend beyond the edge of the well. Tongue-and-groove lumber, well set, answers this purpose and will give ample protection in that it will prevent any filth on the top of the well from getting into the water.

4. A pump fitting closely into the well should be installed. Where a pump cannot be had, there should be a windlass with an automatic tipping device, so that neither the bucket nor the chain need ever come in contact with human hands. An open well, when not in use, should be covered with a hinged top.

¹ Reprint No. 237 from the Public Health Reports.

Where a spring is used, its location is a matter of prime importance. No spring located on a grade below a stable or a privy should be used as a source of drinking-water. In addition:

1. A ditch should be dug around the spring on the grade above it so that no water can wash into the spring from this grade. The ditch should run completely around the spring and connect on either side with the branch.

2. The spring-branch should be kept clear so that water cannot flow back into the spring.

3. The spring should be fenced in so that no animals can have access to it.

4. No bucket or other vessel should be dipped into the spring. Either have a separate vessel to dip water from the spring or else have a trough or pipe to carry the water from the spring to the bucket.

Neglect by teacher and school officials. Lack of information about the seriousness of the conditions found in our rural schools and a dislike on the part of human nature to change a customary way of doing a thing are doubtless responsible in part for the almost complete indifference to problems of sewerage and water-supply on the part of teachers and school officials. There is still another reason. Both teachers and members of school boards hesitate to grapple with such problems because they are disagreeable and somewhat "beneath them." As long as such a spirit is abroad the possibility of making the country a cleaner and more wholesome place to live in is remote.

The responsibility of the teacher. Many a teacher no doubt tries to shift the responsibility by saying to herself that she is paid to teach school and not to look after such matters, which are properly the business of the school board. The indifference of school officials to insanitary conditions is notorious, but that does not excuse the teacher from doing something to improve conditions. The teacher with a true professional spirit will seek to elevate the rural community and to afford better protection to the health of the children

in school. The teacher who begins work in a rural school, where there is a filthy and indecent outhouse possibly in close proximity to the well, but is too *nice* to instruct the children as to the dangers of infection from human excrement or to lead the community to want to better conditions, is neglecting one of the greatest educational opportunities; for unless the children can get the proper attitude toward such problems while in school and do something themselves to better conditions, there is no possibility of their making their own homes more hygienic. The school so far as possible must present models of hygiene and sanitation.

What the teacher may do. The problem of doing anything to improve the general conditions in a school or community may at first seem insuperable. It is absurd, of course, to expect that any teacher remaining for a year or a few months in a rural school where conditions are bad, will be able to get ideal results; but it is the conviction of the writer that if every teacher will attack such problems with vim and do what she can — leaving the rest to her successor — there will be within a few years a marked improvement in both rural schools and communities. The longer a teacher stays in the same school the greater will be the opportunity to gain permanent results.

It now remains for us to suggest what the teacher may do. Let us suppose that you are just beginning your work in a school where the sewerage and water-supply are not of the best. If you have courage, energy, tact, and a high conception of the need and importance of this kind of education, you may do some of these things:

(1) *See that children are informed as to the danger of insanitary outhouses and wells.* One reason for the indifference of children to insanitary and unhygienic conditions is ignorance of well-established facts. As has been said before, in

previous pages, the teacher, instead of planning her course of study for a year according to a textbook, may let the pressing health problems of the school be the starting-point and may make use of the textbooks as a support. The study of the water-supply will necessarily bring up questions as to its usefulness in the diet, how it may be contaminated and how it may carry disease. The dangers from human waste and its proper disposal will necessarily come up. In regions where hookworm disease abounds children should be instructed as to its nature, ways of spreading, consequences, and prevention. The teacher may find it hard to talk about such matters, but if she will first of all convince herself that to ignore them is a false kind of modesty and cannot be defended from the standpoint of good judgment and common sense, she will find it less difficult. While such matters should be handled tactfully and with well-chosen language, they should come out simply and naturally in connection with the instruction given. Textbooks should be used if they throw light on these problems.

(2) *Discuss with children the sanitation of school privy and well.* The general discussion of these problems should lead naturally to the concrete problems of the school. It would be better probably to take up these matters separately with boys and girls. If there is a separate privy for boys and girls, that of the boys will usually be the more filthy. The question proposed should be this: Are we doing all we can to make our outhouses and well sanitary? The children should be asked point-blank whether they are satisfied to have a filthy privy which is a menace to health and something they might be ashamed of if visitors came. The teacher might also discuss with them what they thought they could do and what they were willing to do to make privy and well more sanitary. It is only by such methods of coöperation that results can be obtained. The making of rules and regulations

and trying to force children to obey them will arouse the antagonism of children and community.

(3) *Secure coöperation of pupils to make privy more sanitary.* If pupils are approached in the right spirit there will be little difficulty about getting them to coöperate. Usually a crying need in the care of the outhouse is cleanliness. It is not uncommon to go into an outhouse and find the seats so covered with excrement that they cannot be used with comfort, thus leading the children to postpone their visits as long as possible — thereby interfering with the habit of evacuating the bowels regularly and so laying the basis for constipation. Often the privy may be avoided entirely and human filth be deposited in unseemly places. If it is used, there is danger of soiling the hands or tracking filth on the shoes into schoolhouse or to the rickety platform of the well. Often when a school board is asked to have the outhouse cleaned they reply that it is useless, as the children will not keep it so. To offset this possible objection the children and teacher might petition the school officials to have the privy cleaned, promising thereafter to keep it in good condition. If the privy is of the ordinary pit type, it would be wise also to have the pit cleaned out or the outhouse moved. With the help of school officials, or children, or both, covers might be provided and the outhouse screened from flies. The pit privy is, as has been said, usually unsafe, especially if there is a well on the premises. It would be a splendid example of sanitation if the privy could be altered so as to have a removable receptacle. This might be accomplished through the school officials, or in some cases possibly by some of the larger boys who are handy with tools. It would be wise not to attempt anything of this kind if the school or the community are likely to be hostile to the suggestion. Practically any existing privy-house may be fitted with slight alterations so as to hold a receptacle box. (See

Figs. 13 and 14.) In this way an insanitary privy may be made sanitary at a cost of not more than two or three dollars. Any water-tight receptacle may be used, but a cylindrical can of galvanized iron will usually be most suitable.¹

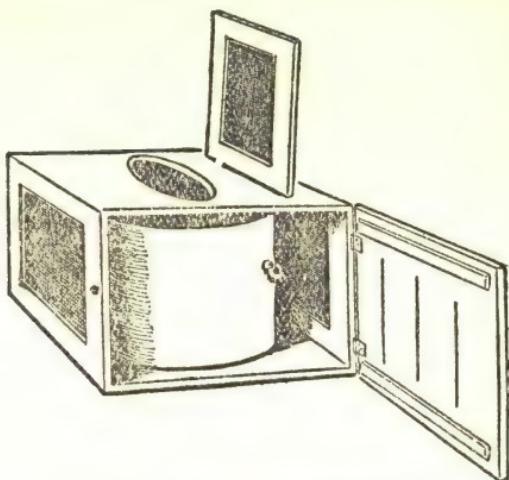


FIG. 13. THE BOXED RECEPTACLE

Flies are excluded by the fly-tight box. Ventilation is provided by screened openings in the sides of the box and in the lid. The hinged front permits ready removal of the can for cleaning. Such a device is safe, sanitary, and convenient, and may be placed in an existing privy-house or in any suitable out-building. (Original.)

(Courtesy of U.S. Public Health Service. From Public Health Bulletin No. 68.)

cylindrical can of galvanized iron will usually be most suitable.¹

One difficulty in the use of such an outhouse is the necessity of emptying the receptacle at regular times. This must be arranged for in some way, possibly by the pupils themselves. This will be a much less disagreeable task if children can be trained to put a shovel of lime or sand into the

receptacle after using the toilet. An outhouse with a large tank or receptacle requiring less frequent removal would be desirable.

Ultimately when rural communities become alert to the grave dangers of the open vault, it will be possible to install in every country school a system of septic tanks connected with washout toilets.² The outhouse of the country school is now a national disgrace and a grave enemy of health, wholesomeness, and morality.

¹ For further description see Public Health Bulletin No. 68.

² An excellent discussion of this topic is found in Dresslar's *School Hygiene* (Macmillan), chap. ix.

Secure coöperation of pupils to make the drinking-water more sanitary. If the privy cesspool can be eliminated one menace to the drinking-water has been removed. There is much that the children may do to improve the water-supply if they are properly encouraged and if some of them can handle ordinary tools. For example, if the well is likely to receive surface water from the top of the ground after a rain, a ditch might be dug around the well with proper outlet. If the platform of the well admitted dust and waste water, in a country where lumber was plentiful children might put another layer of boards, preferably of matched lumber, over the platform, or a broad trough might be made to put under the spout of a pump to carry off waste water.

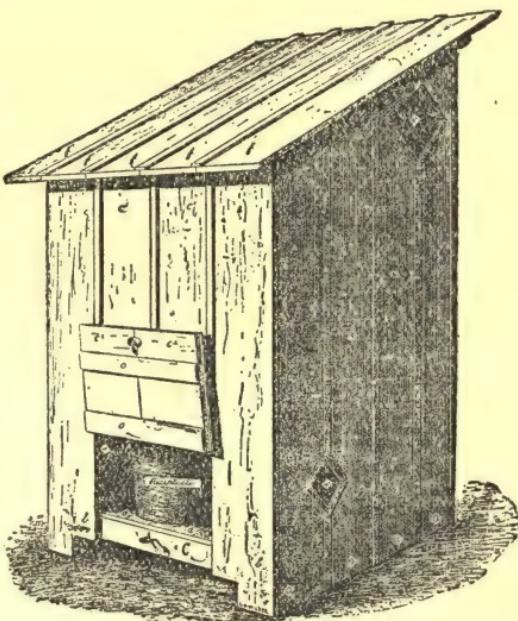


FIG. 14. REAR AND SIDE VIEW OF A REMOVABLE-RECEPTACLE SANITARY PRIVY. (STILES, 1910.)

An insanitary privy may be altered according to this plan with little expense so as to be wholesome and sanitary.

(Courtesy of U. S. Public Health Service. From Public Health Bulletin No. 68.)

The drinking-water may be pure as it leaves the well and yet be contaminated before it is drunk. Often the water pail itself is left uncovered, exposed to dust, and a common cup makes it easy for disease to be passed from one child to a whole school. The common cup has now been proved to be most insanitary. Davidson found cells, scraped from the

lips of persons who drank, so numerous in the upper part of the glass that the head of a pin could not be placed thereon without touching some of these pieces of tissue. One hundred thousand bacteria were present to every square inch of

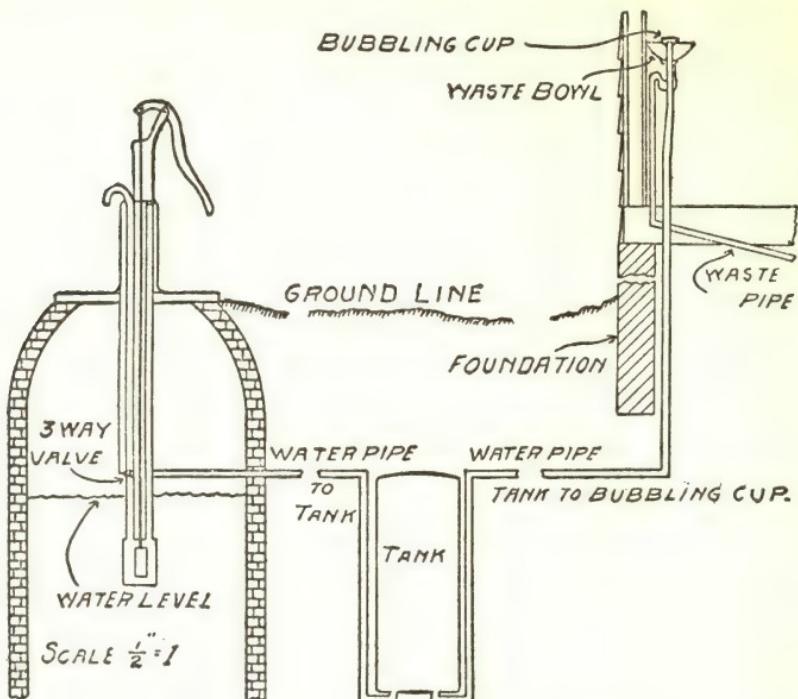


FIG. 15. A SIMPLE WATER-SUPPLY SYSTEM

The water is always cool and easily available. Such a system has advantages over an ordinary bubbling fountain. There is always enough force to raise the water so that the children are not tempted to apply their mouths to the bubbler, and the tank being underground and outside of the schoolroom is never warm. The first district normal school at Kirksville, Missouri, estimates the maximum cost of installation as \$30.

glass. In the survey of Porter County the common drinking-cup was found in 14.3 per cent of the rural schools of the county, individual cups only in 42.5 per cent, and individual cups by some of the pupils and the common cup by the others in 40 per cent. In the majority of States the common drinking-cup has now been condemned, but the individual

drinking-cup, unless the children are properly trained, as was shown in the above-mentioned survey, may be but little better. Children will exchange cups. They will carry them in dirty pockets, will drop them on the floor where they may gather dirt of all kinds, and will often lose them. The common cup should go, of course, whether there is a law requiring its abolition or not, but the teacher should see that pupils are trained in the use of its successor, the individual cup. Each child will find it easy to secure a cup at home. A plan must then be devised for its use. This should be thought out by the children with the help of the teacher. Cups may be hung on the wall in such a way that they will not drip on each other. A slip of paper with the child's

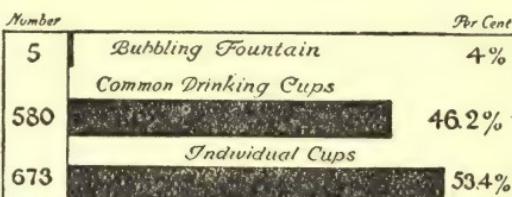


FIG. 16. REPORTS FROM 1258 RURAL SCHOOLS
IN 18 STATES SHOW THESE FACILITIES
(Bureau of Education. Bulletin, 1916, No. 2.)

name should be pasted just below. The teacher's responsibility does not end here. She should see that the cups are really used individually and are cleaned regularly. The cleaning may best be accomplished by appointing a regular time for each pupil to clean his cup. The cup which is dipped into the pail to fill the individual cups should never be used as a drinking-cup. It would be better to use a large pitcher so that this go-between cup would be unnecessary. Paper drinking-cups may also be made by the children (see Fig. 10). A large number might be made at one time and kept in individual desks for use, but care again needs to be exercised by the teacher to see that they are not passed along. If the paper cup is used, it would be desirable to have a box closed in on all sides, but allowing an opening at the top so that paper cups once used could be disposed of.

The paper drinking-cup, or any kind of individual cup, is preferable to the common drinking-cup, but it should be abandoned as speedily as practicable for the bubble fountain. Money for such purposes might easily be earned by the children through some entertainment. An excellent fountain at a reasonable price may be secured from the Waterman-Waterbury Company, Minneapolis, Minnesota.

Common towels must go. Under no circumstances should a common towel be tolerated. It is as dangerous to health as the common drinking-cup. Eye and skin infections and other diseases are often communicated in this way with ease. Paper towels, which may be ordered of any dealer in school supplies, best solve the problem. If the purchase of these at first proves impracticable, children should be urged to bring their own towels, which should be put carefully on individual hooks. Such a plan is, however, only a makeshift, and should be abandoned as soon as possible. All children need to be taught to wash their hands after returning from the toilet and before eating.

Enlist the interest and coöperation of parents, school officials, and community. While the teacher might be able to accomplish many things that have been mentioned without the coöperation of the general community, few permanent achievements can be made without getting such help. The teacher may find it desirable to invite some physician to talk to parents on a sanitary water-supply and the proper disposal of sewerage. Possibly a stereopticon lecture might be given. Such an occasion would give the teacher an opportunity to tell parents about her plans with the children and some of the needs of the school. If the parents and school officials are once made to feel that the teacher is striving to do something beneficial for the children there will be little doubt as to her securing their assistance.

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11. C. W. Stiles. *Country Schools and Rural Sanitation*. United States Public Health Service, Reprint no. 116; pp. 5.
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Interesting study of mental and physical tests of 115 children in a hookworm-infected country to determine difference "between non-infected children, infected children who are not treated, and infected children before and after treatment."
14. G. C. Whipple. *Pure Water*. State Board of Health of Jacksonville, Florida. Publication 128; pp. 21.
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17. *Ground-Itch or Hookworm Disease and Soil Pollution*. Public School Health Bulletin no. 2, Office of Superintendent of Public Instruction, Raleigh, North Carolina.
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19. *The Danger Zone on the Farm — Sewerage Disposal*. Virginia State Board of Health Bulletin, vol. vii. no. 6, pp. 248-62.
Excellent. Describes in detail how to make a sanitary outhouse. Many drawings.
20. *The Sanitary Box*. Virginia State Board of Health Bulletin, vol. vi, extra no. 6, pp. 136-38.
How to build a sanitary device cheap enough for the poorest home. Drawing.

CLASS EXERCISES

1. Let every member of the class inspect the water-supply and sewerage in at least two rural schools. Make a summary of these observations. Make a detailed plan showing just what you would try to do as a teacher to improve conditions noted.
2. How many of the rural schools visited presented models of sanitation to their communities with reference to sewerage and water-supply?
3. In how many schools did the teacher take an active part in bettering the conditions? If so, how?
4. What is the ideal location of a pit privy with respect to the drinking-water source? In how many rural schools have you found such ideal locations?
5. How does an artesian well differ from an ordinary well?
6. In how many of the schools inspected were the children trained in personal habits of hygiene, such as using individual drinking-cups and individual towels? Make a list of such habits and find out the teacher's methods in getting these habits established.
7. In how many of the schools visited were there proper facilities for washing the hands? What was the teacher doing to get children to keep their hands clean and their nails properly manicured?

CHAPTER VIII

WAR ON FLIES, MOSQUITOES, AND OTHER DISEASE-CARRYING INSECTS

The fly is an unmitigated nuisance and should be wiped out. No halfway measures should be considered. Fortunately this is perfectly possible; for his presence is our own fault and nothing else, as he can lay his eggs and hatch only in piles of dirt and filth found about our own houses, barns, and outbuildings.

(*Woods Hutchinson.*)

THE causes of sickness and death have been among the greatest mysteries of life. Primitive man seeking to explain these unfortunate experiences ascribed them to evil spirits. In primitive communities there was usually a medicine-man who was believed to be able to drive away these bad spirits by beating on tom-toms or by laying the hands on the parts of the body affected and mumbling strange words. Among civilized men disease has sometimes been thought to be a curse of God for some sin committed. Although many of the modern theories were foreshadowed by physicians during the ancient and mediæval times, modern preventive medicine could not exist until the microscope was invented, the germs of disease discovered, and their responsibility for disease really proved. Even after the germs were discovered, they were for a long time mere curiosities. It was not until 1877 that Pasteur, through a wealth of experiments, proved to an astonished world that these minute living organisms, invisible to the naked eye, were responsible for disease. The cause of contagion, which had been a total mystery clothed in vague terms like "humor," virus, etc., was no longer guessed, but known. Even after microscopic organisms were held responsible for disease, the question as to how they gained access to the human body had to be ascer-

tained. This problem was solved to a considerable extent during the latter part of the nineteenth century, thereby bestowing many rich blessings upon mankind.

How diseases are communicated. It was thought at first that environment was the principal source of infection, and while it is true that water, air, soil, and food may be the vehicles by which communicable diseases are often transferred, they are only the media of conveyance and not the real source of disease. Most germs are really frail beings that cannot live long in our environment such as the soil and water. *The main source of the diseases of man is now believed to be man himself*, although there are a number of diseases which man contracts from the lower animals. Disease may be transferred from man to man directly or indirectly. When there is contact infection there is a transfer of quite fresh infective material. It is not necessary that two individuals should come directly in contact, as in kissing, but the conveyance must be pretty close as to time and space. Contact infection may take place through soiled hands, or contaminated towels, or infected cups or spoons. Many diseases may be communicated indirectly through water, food, soil, air, or insects. Since 1893, when it was first definitely known that insects carried disease, practically every insect, and animal as well, has been under suspicion. In some diseases they are the sole carriers.

The case against the fly. "As harmless as a fly" has become a proverb in our language, but it needs to be revised so as to read, "As dangerous as a fly." The common house fly is born in filth, usually in horse manure, human excreta, or other wastes. It has been found that a single fly may carry from 570 to 4,400,000 bacteria upon its surface, and from 16,000 to 28,000,000 in its intestinal tract. Among the diseases which he may convey are typhoid, cholera, dysentery, diarrhoea in infants, erysipelas, diphtheria, smallpox, and

parasitic worms. In rural regions, where the contents of outhouses are so frequently exposed to flies, there is probably even a greater possibility of flies carrying disease than in the city. Then, too, in the country there is so little care taken of barns and piles of manure that flies breed in great profusion, so increasing the possibility of infection.

Woods Hutchinson sums up the case against the fly in these words:

A fly in the house is as dangerous as a rattlesnake, as filthy as a louse, and as disgraceful as a bedbug. The time will come when any modern, cleanly home will feel itself shamed and disgraced by the presence of a fly, and when every householder upon whose premises a brood of flies is detected will be heavily fined or sent to jail.

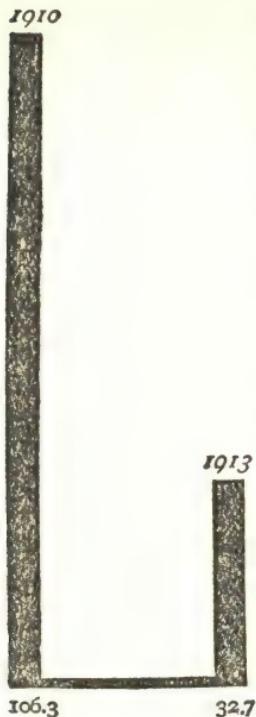


FIG. 17. DIAGRAM SHOWING THE DEATH-RATE FROM TYPHOID FEVER IN CITY OF JACKSONVILLE, FLORIDA

In 1910 there were 8500 open closets in the city. By 1913 these closets had been screened against flies. No other changes in the sanitary condition of the city that would affect the typhoid death-rate were made during this time.

(From Ritchie's *Primer of Sanitation*, with the permission of The World Book Company.

process is the laying of the eggs. (Fig. 18, 1.) The fly is very prolific in this. A single female fly lays from one hundred to

Studying the life-history of the fly in rural schools. The danger of the house fly should, of course, be prominent in the course of study, but one of the best introductions to this topic would be the study of the fly itself rather than pages in the textbook. Dr. Hodge suggests that a glass can containing manure in which there are many eggs of the fly be put into the schoolroom where the different stages of the growth of the fly can be watched by the children. In its growth the fly passes through four distinct stages. The first stage in the

one hundred and fifty eggs at a time and eggs may be produced several times during a season. As the eggs hatch they pass into the second stage and become maggots. (Fig. 18, 2.) Each maggot or larva then becomes a pupa in a hard brown case. The insect then enters into a dormant state during which, motionless and without food, the transformation goes on from the maggot to the perfect winged insect. It takes about ten days for the eggs to pass through the various stages to the development of the adult house fly.

If children watch these different stages through glass they will gain useful and interesting information. Dr. Hodge believes they will gain something else, a feeling of disgust for the house fly. They see it develop in the filth and it requires only a slight suggestion to think of its wiping its feet on their food. If once this feeling of disgust and repugnance for the fly is aroused, the enlistment of the pupils in the war against the fly is assured.

While the experiment which we have just suggested is going on, another of practical importance may be instituted. Get another can containing horse manure filled with fly eggs or maggots and apply to it a little kerosene or powdered borax in a solution of water. A comparison of results

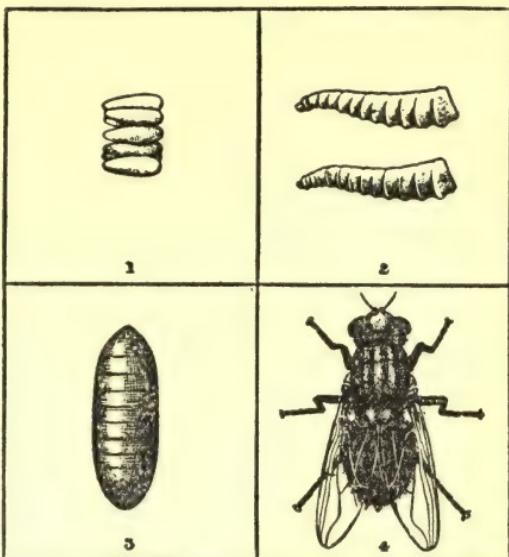


FIG. 18. THE FOUR LIFE STAGES OF THE
HOUSE FLY

(Courtesy of the State Board of Health of Maine.)

will show that the can thus treated will develop no flies. One practical method for the prevention of the growth of the fly is thus demonstrated.

In connection with these experiments the attention of the children should be called to the anatomy of the fly's feet, which are particularly well adapted for the carrying of filth. Not only may the flies carry filth on their feet, but their dejecta may be left on our food. The fly also has the nasty habit of returning through his suction tube drops of the material with which he has gorged himself.

Much of what has been said here is very disgusting, but it must be remembered that a feeling of loathing for the fly is necessary in the child's education.

The fly problem in rural schools. The various surveys of rural schools show that flies frequent the schools in large numbers. Here is a description of conditions in California:¹

California is often poetically called the land of flowers. Not so poetically, but with equal truth, it might be called the land of flies. The rural school is not infrequently filthy as a result of flies. One teacher told me recently that they swarmed into her schoolroom by the thousands. They fell into the water-bucket. (Yes, that old moss-covered bucket is still in evidence.) They crept into the children's lunches in a most disgusting fashion, and only a few feet away were the insanitary toilets. This is a somewhat exaggerated case, but in hundreds of our rural schools flies are a pest and no attempt is made to exclude them from the room by screens or so to fix conditions that they could not be so numerous.

Dr. Rapeer, in his study of rural school hygiene in Pennsylvania, says:²

I have seen rural schools full of flies in my visits. Desks were covered with remains of pupils' lunches and the warmth of the

¹ Margaret E. Shallenberger, *Hygienic Needs of California Rural Schools*, *Proceedings*, Eighth Congress of the American School Hygiene Association, vol. v, p. 64.

² Louis W. Rapeer, *Rural School Hygiene* (section of the *Pennsylvania Rural School Report*, 1914), p. 15.

rooms had kept the flies alive till late in the fall. Such teachers may teach the spread of infection by flies when they come to the subject in the hygiene textbook while by their neglect they may be spreading disease. In one case the flies were so numerous that one to three or more could be seen on each piece of pie and other food that children were eating.

The quotations above probably reveal conditions that are common in rural schools in every section of the country.

Presenting the problem to the children. Before the study of the fly, which has been outlined, has been completed, the pupils of the school are likely to call the teacher's attention to the presence of flies in the schoolroom. The vital question which must come before the school is then: "What are we going to do about it? Shall we allow filthy flies to contaminate our school home or shall we do something to rid ourselves of their disgusting presence?" If a modern textbook is in the hands of the children, they may now consult it to find out what is to be done. Most of the children will be able to suggest remedies from methods which they have seen tried.

After the fly has his wings there are at least three measures which may be taken against the evil-doer: (1) Flies may be destroyed; (2) they may be excluded from the schoolroom and from food-supplies; (3) they may be excluded from places or materials where they may become infected.

It is only by attempting to solve the fly problem in school that the reading in the textbook or the instruction of the teacher will be profitable. Train the children at school.

"Swatting" the fly. Every school may do something to rid itself of the fly pest. One method, which is good so far as it goes, is to train children to kill every fly seen. This may be attempted through the use of the fly-swatter which may be purchased now at most general stores for a few cents, or one may be made by nailing a small piece of a wire screen

on a stick. To prevent the soiling of schoolroom walls and furniture, the piece of screen should be edged with cloth.

Poisoning flies. The use of poison is one method of destroying flies, although care needs to be taken to see that it is not exposed so that it may injure little children or domestic animals. These dangers, however, are most probable in the home where the children may be younger than school-children and where domestic animals are common.

Every child should know about fly poisons and how they may be used. One of the safest and most satisfactory kinds of fly poison is formaldehyde. The State Board of Health of Maine recommends these two different mixtures, either of which may be used according to preference:¹

(a) Mix one ounce (two tablespoonfuls) of formaldehyde (formalin) with one pint of equal parts of milk and water.

(b) One tablespoonful of formaldehyde in one pint of water sweetened with two teaspoonsfuls of sugar.

One of these solutions may be kept in the schoolroom. A slice of bread in the middle of the dish furnishes more space for the flies to alight and feed. It is a good plan to leave this solution in dishes in the schoolroom after school is closed for the day and after all other opportunities for drink have been carefully removed. Flies are thirsty insects, and by the time the schoolroom is opened in the morning the probability is that practically all the flies will be dead. They should be carefully swept up in the morning and put into the stove or some other safe place.

In some locations, outside a screen door or under a veranda, for example, where a saucer would not be practicable or possible, the mixture may be given to flies as shown in Fig. 19. "A half pint or a pint bottle with a nick in the top

¹ *The Filthy Fly as a Disease-Carrier.* Circular No. 122, State Board of Health of Maine.

of it filled with the poison mixture is quickly inverted in a small shallow dish. The bottle in that position in the shallow dish should be supported upon a bracket and hung up where the flies abound. With a nick in the mouth of the bottle of the right depth there will be in the dish only a shallow pool of the poison all the time."

How to make sticky fly-paper. A great help in catching flies is to tack sticky fly-paper to a board suspended from the wall. The fly-paper is not poisonous, but it should be placed where there is no danger of children getting into it. If the interest of the children is sufficiently aroused enough money may be raised to buy some of this paper at the stores. A substitute for the commercial product may be secured at a very reasonable price by boiling a pound of resin in a little more than half a pint of lard. If it is kept in a wide-mouthed jar, it can be spread on paper as needed.

Teaching children how to make and use fly-traps. The fly-trap has many advantages over the other methods of destroying the fly to which we have referred. There is no danger from poison and no inconvenience as is frequently found from the use of sticky fly-paper. No child should leave a rural school without knowing how to make and operate a good fly-trap. This work could come in as a part of the manual training. If time cannot be found to do it in school, it might be done as a part of the home work. This may be done with little difficulty, if the work is carefully planned and the children know exactly what they are to do. Directions for making an ordinary-sized fly-trap including

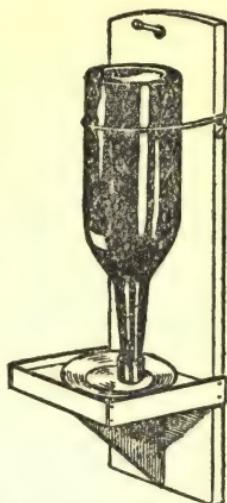


FIG. 19. A SIMPLE HOME-MADE DEVICE FOR POISONING FLIES

(Courtesy of the State Board of Health of Maine.)

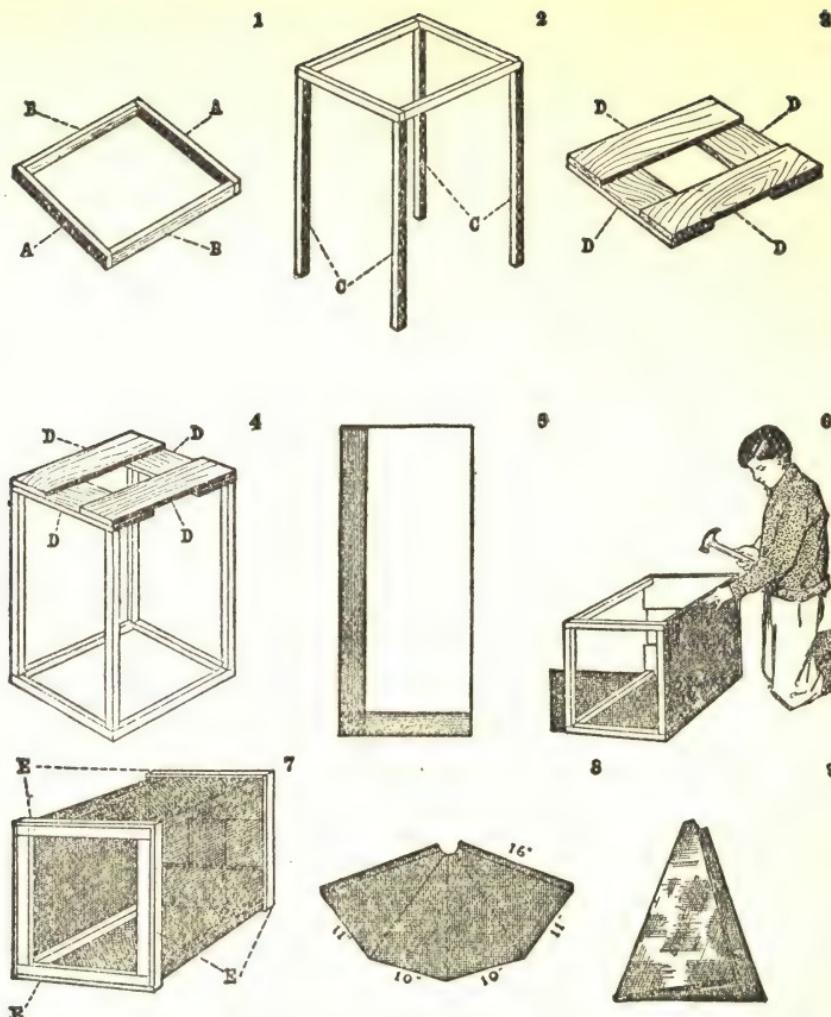


FIG. 20. DIRECTIONS FOR MAKING A FLY-TRAP

Material needed:

Lumber, 2 pieces, 1" X 1" X 12"	A	2 pieces, 1" X 1" X 10"	B
4 pieces, 1" X 1" X 18"	C	4 pieces, $\frac{1}{2}$ " X 4" X 12"	D
8 strips, $\frac{1}{4}$ " X $\frac{1}{2}$ " X $12\frac{1}{2}$ "	E		

1. Nail the four strips marked "A" and "B" to make bottom of frame.
2. Nail bottom to the four pieces marked "C."
3. Nail four pieces marked "D" to make top.
4. Nail top to upright posts.
5. Cut fifty inches from your piece of screen for covering frame.
6. Fasten screen to frame as shown in diagram.
7. Nail strips marked "E" over the top and bottom edges of the screen to hold it firmly in place.
8. Cone.
9. Fold as indicated.

(Courtesy of International Harvester Company of New Jersey, Incorporated.)

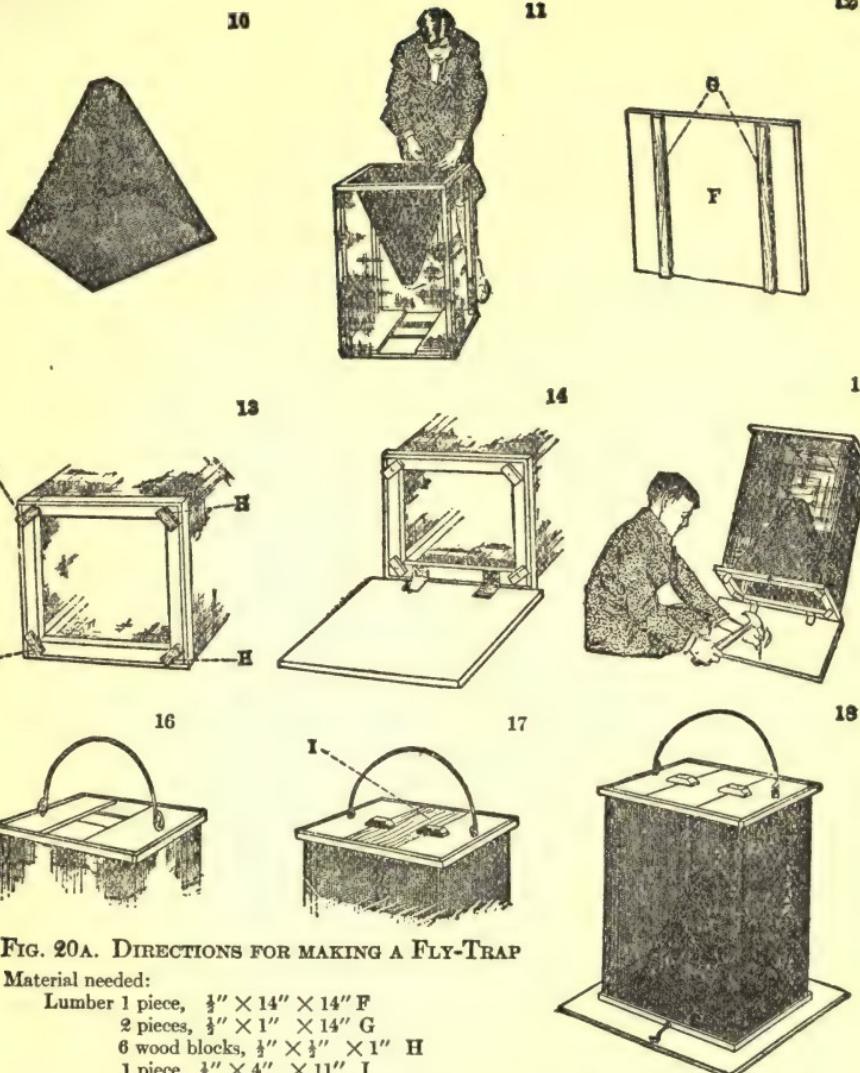


FIG. 20A. DIRECTIONS FOR MAKING A FLY-TRAP

Material needed:

Lumber 1 piece, $\frac{3}{4}'' \times 14'' \times 14''$ F

2 pieces, $\frac{3}{4}'' \times 1'' \times 14''$ G

6 wood blocks, $\frac{1}{2}'' \times \frac{1}{2}'' \times 1''$ H

1 piece, $\frac{3}{4}'' \times 4'' \times 11''$ I

2 leather hinges 1 screw hook and eye 2 screw eyes

76 inches of 20-inch wire screen 1 piece broom wire, 22 inches long

10. Completed cone.
11. Nail cone in frame.
12. Nail cleats marked "G" on bottom board marked "F." (See Figs. 14, 15, and 18.)
13. Nail wood blocks marked "H" to corners of bottom of frame to allow space for flies to enter.
14. Hinge bottom board to trap by the two leather hinges.
15. Put in screw hook and eye.
16. Place screw eyes and put on bail.
17. Lay piece marked "I" over opening at top and fasten with wood blocks, marked "H."
18. Completed trap — Bait with banana peeling, vinegar and sugar, piece of meat, etc.

(Courtesy of International Harvester Company of New Jersey, Incorporated.)

eighteen drawings may be purchased for a few cents by sending to the International Harvester Company, Agricultural Extension Department, Chicago. Directions for making this trap are reproduced here with the permission of the publishers.

Where flies are very plentiful a larger trap may be desirable. A simple form of outdoor trap may be made from any kind of tight barrel with the ends knocked out as shown in Fig. 21. A so-called "apple barrel" may be secured readily at any grocery store. Traps like this have been known to ensnare over a bushel of flies in a week. Such a trap may not be beautiful, but if one were made by the teacher and children, it would demonstrate how easily a fly-trap may be made, and if placed near a stable in the vicinity of a schoolhouse, it would demonstrate its effectiveness in a few days.

After a trap is made, success in catching flies depends on baiting it with something attractive to flies, like scraps of meat, bits of fried fish, or fish heads, or melon rind. Many of the flies caught in a trap soon die from starvation and thirst. Those remaining may be killed by closing up openings to the trap and burning a small piece of sulphur under the trap. A small trap may be immersed in hot water.

A few good fly-traps, some placed inside and some outside the schoolhouse, would probably greatly reduce the number of flies in the vicinity, but it would do something else; the instruction would reach the home. Some of the fly-traps not needed for school use would be taken home and used. Probably some of the most enterprising boys would make one of the larger traps from a barrel, "just for the fun of doing it." In a neighborhood where a little effort was already being exerted to get rid of flies, this instruction by the teacher would be very welcome to parents.

Screening against flies. Even in the very best rural communities, where the screening of the windows is not un-

usual, it is seldom that a schoolhouse can be found screened. If flies frequent the school premises in great numbers, screening is very necessary. Often a suggestion to the school offi-

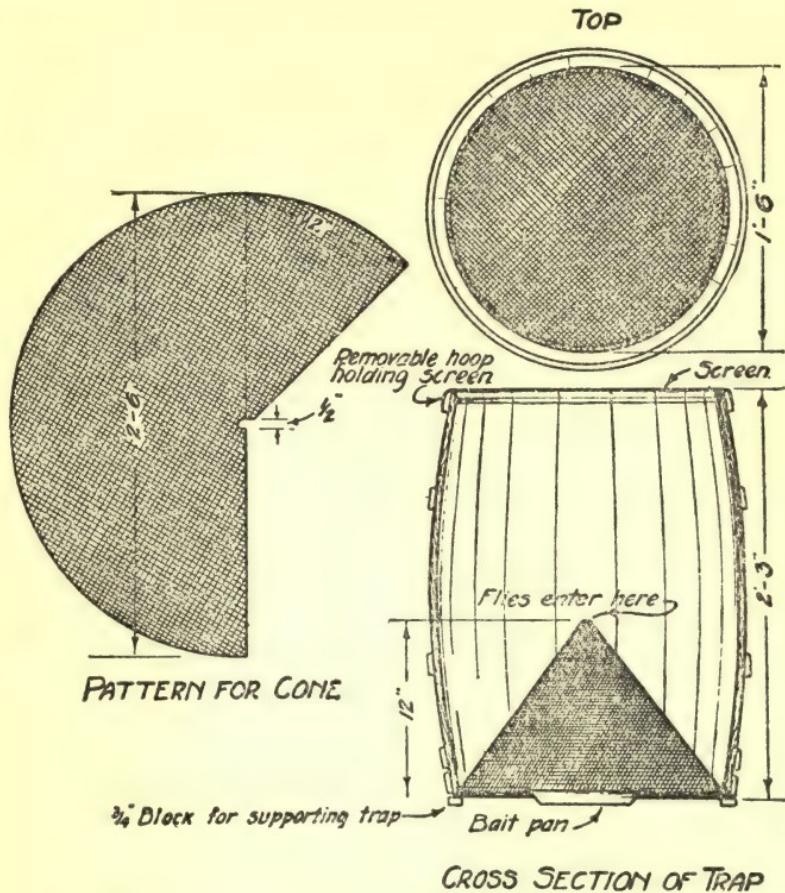


FIG. 21. SKETCH SHOWING HOW A FLY-TRAP MAY BE MADE WITH AN ORDINARY APPLE BARREL

This sort of fly-trap has been known to catch a bushel of flies in a week.
(Courtesy of Illinois State Board of Health.)

cial will be sufficient to get screens for doors and windows. If this is not effective, the children might be able to bring remnants from home so that some screens might be made.

A slight contribution by each pupil in the school would make it possible to cover doors and windows with netting.

Destroying the breeding-places of flies. Killing, catching, and poisoning flies are temporary expedients. A better way to solve the problem is to prevent their breeding. Often there may be a badly kept stable near the schoolhouse, over which the school has no control, and the most effective method of preventing the fly from ever making his appearance cannot be used. When such a situation exists the methods already mentioned must be relied upon. Often, however, flies breed in the privies or in old garbage-cans or in garbage that is dumped upon the ground. Here is an opportunity for the school to study the problem and decide what to do. Covers to privy-holes might be made by some of the boys and the contents of the pit screened.

Instruction as to a sanitary barn. Most flies are bred, as has been noted, in the piles of manure which are usually allowed to accumulate for an indefinite length of time near barns in country districts. Little can be done directly by the school to better these conditions, but children may at least be told about the requirements of a sanitary stable. The probability is that if children get a hygienic ideal with reference to the fly through the many activities we have recommended and are given information regarding a sanitary stable, some of the information may function. General cleanliness around a stable, the storing of manure in a bin so that flies cannot get to it, the frequent hauling of manure to the fields where it is spread thinly over the soil, its treatment with powdered borax and hellebore to kill the larvæ — all these things will help to make the farm more sanitary. The probability is that the farm can never be made flyless because of the many opportunities for breeding, but something can be done to mitigate the evil. If there is a sanitary stable in the vicinity, it may be visited by the children.

Otherwise the teacher must rely on pictures and reading matter.

At Saranac Lake, New York, there has been a spirited campaign against the fly. Every barn was inspected and the owners advised as to the most approved methods of destroying larvæ and screening or properly caring for any material which might serve as a breeding-ground. The following score card, which may give children a good idea of estimating the sanitation of a barn, was devised:

BARN SCORE

Owner.....	Class.....		
Location.....	Date.....		
Barnyard		<i>Score</i>	<i>Possible Score</i>
No scattered rubbish.....	3		
No scattered manure (no yarding).....	4	7
Barn			
Neat appearance.....	5	5
Floors			
Cement.....	3		
Wood.....	2		
Clean.....	5	8
Stables			
Cement.....	3		
Wood.....	2		
Drain.....	2		
Abundant clean bedding.....	5		
Clean.....	5	15
Animals			
Clean.....	5	5
Manure bin			
Cement.....	20		
Wood.....	10		
Covered.....	5		
Fly proof.....	20		
Maggot exterminator used daily.....	5	50
Ventilation			
Ventilators.....	3		
Sufficient air space per animal.....	4	7
Hose faucet			
In use frequently.....	3	3	

Celebrating fly week. In several States a week has been appointed by the Governor, State Superintendent of Public Instruction, or the State Board of Health to make a drive on the fly. The schools are always asked to participate in the campaign. In villages, towns, and cities there may be special efforts to get lecturers and arouse enthusiasm, but in the country the teacher can profit from the general talk about the event and the advertising through the newspapers. Then is the time to have a contest to see what pupil can trap the largest number of flies or to ask every pupil to do what he can to solve the fly problem in his own home.

Compositions on the fly. Children's compositions are always more valuable if they describe their own personal experiences. The various phases of the campaign against the fly may be presented through compositions. Some of the compositions may be more or less imaginary, telling about the experiences of a fly. Such a composition helps to bring home to the child the menace of the fly. Below is found a prize composition of this character written by an eleven-year-old girl who was honored for her work by the Fly Fighting Committee of the American Civic Association:

WHY IS THE HOUSE-FLY DANGEROUS?

"Won't you come into my parlor?" says the spider to the fly.

"No," says the fly to the spider, "I will bring you all kinds of diseases such as typhoid fever and tuberculosis."

"Well, I'll take the risk," says the spider.

"No, I'll not come in, but, if you will listen, I will tell you my history, and then I am sure you'll not want me," replied the fly.

"Well, my mother told me this much. She said I came out of a little egg laid with many others in a manure pile. When I was hatched I did n't have any legs or wings, and was called a maggot by our worst enemies, men. I stayed in that form for five days. Then I had a thick brown coat and went into a sleeping stage which was called a pupa. When I shed that I was like I am now, a full-fledged fly.

"You have often wondered why I did not get in your web or get caught by you. Did you know I had many eyes that are put together to make one? With these I can see on all sides, and so I am very hard to catch.

"My worst enemies are you and your family, some beetles and a little reddish mite.

"I always lay my eggs in manure or other filth. The people are screening it and burning it and burying it. They try to kill us by carbolic acid and sticky fly-paper where so many of my friends have ended their days.

"People have some stuff, too, that they put in water and put in their bedrooms. They call it formalin, but I keep away from it, as it is sure death.

"The worst trouble I have is where the people screen their houses and keep their yards clean so we can't get anything to eat.

"Our worst danger is not the carbolic acid or fly-paper and such things, though, for after we *are* once hatched they can never kill us all off, but if they start out to destroy our breeding-places, the manure pile and other filth, we will soon be gone from the earth. I hope men will never find that out, but I fear they will some day."

A fly catechism. The test of the effectiveness of the teaching of hygiene in connection with the fly depends on action rather than information. Nevertheless, some sort of a condensed statement of facts about the fly is valuable. Many boards of health have formulated catechisms on the fly. One of these, which has had a wide circulation throughout the United States, was published by the State Board of Health of Indiana. In some cities it has been printed and ordered to be pasted on the inside covers of school-books. It is a good illustration of the kind of material which a teacher may often get from boards of health, material which might be posted to advantage on the school bulletin board. It runs as follows:

FLY CATECHISM

1. Where is the Fly born? In manure and filth.
2. Where does the Fly live? In all kinds of filth and he carries filth on his feet and wings.

3. Where does the Fly go when he leaves the manure pile, the privy vault, and the spittoon? He goes into the kitchen, the dining-room, and the store.
4. What does the Fly do there? He walks on the bread, fruit, and vegetables; he wipes his feet on the butter and he bathes in the milk.
5. Does the Fly visit patients sick with consumption, typhoid fever, and cholera infantum? He does and he may call on you next carrying the infection of these diseases.
6. What diseases does the Fly carry? Typhoid fever, consumption, diarrhoeal diseases, diphtheria, scarlet fever, and in fact any communicable disease.
7. How can the Fly be prevented? By destroying all the filth about your premises; screen the privy vault; cover the manure bin; burn all waste matter; destroy your garbage; screen your house.

Either Man Must Kill the Fly or the Fly Will Kill Man

PREVENT THE FLY

INDIANA STATE BOARD OF HEALTH

The mosquito as a carrier of disease. Malaria, popularly known as *ague* or chills and fever, has long been associated in the popular mind with low ground and swamps. It was finally observed that these were not necessarily connected, for some swamps and marshes seemed to be entirely free from malarial conditions. The real cause of malaria was unknown until 1880, when Laveran, a French investigator, found in the blood of malarial patients a particular kind of microbe. But even after the microbe had been discovered it was a complete mystery as to how it entered the human body and how it was conveyed from victim to victim. Finally, in 1899, the riddle was unexpectedly cleared up. After a number of brilliant investigations, the malaria germs were discovered in the body of the mosquito. A score or more of eager students and doctors offered to allow themselves to be bitten by infected mosquitoes. These experiments showed

that the mosquito conveys the disease from one person to another by his bite. Fortunately, it was found that the common piping or singing mosquito (*Culex pipiens*) did not carry the disease. Only a rare kind of mosquito (*Anopheles*) is responsible. Later it was also discovered that the dreaded yellow fever was also carried by another kind of mosquito (*Stegomyia*) which frequents the tropics and sometimes the southern part of the United States. As a result of this discovery, Panama, Cuba, and all other places which have inaugurated preventive measures against the mosquito, have practically banished yellow fever. As the rural school is almost entirely concerned with the malarial mosquito, there will be no further references to the yellow-fever mosquito.

The mosquito problem in rural schools. Since the malarial mosquito makes his presence known most frequently toward night or very early in the morning, the mosquito problem is not so acute in rural schools as the fly problem, but nevertheless investigations show that many school-rooms are visited by mosquitoes. This is more likely to be the case when the school is near low, marshy ground. As in the lessons on the fly, the teacher should try to get the children to do something. Mere information about the mosquito is not educative.

Study the mosquito itself. The work in hygiene should be planned so that the mosquito can be studied at the time of year when he can be easily found. As a guide to such a study teachers are referred to that excellent pamphlet, Carter's *Malaria; Lessons on its Cause and Prevention*, Supplement no. 18 to the Public Health Reports. Rural teachers in Virginia will find the Virginia Health Bulletin, *A Short Catechism on Malaria*, full of practical suggestions. Every teacher, particularly in malaria-infected regions, should form a field class "to find the larvæ of the different kinds of

mosquitoes and to identify them and to learn to recognize the different places in which they breed; where the eggs of the different families of mosquitoes may also be found and identified."

For teaching children the most important facts concerning malaria, Dr. Carter suggests the following with reference to the direct study of the mosquito:

Culex mosquitoes will be found in almost any standing water, especially in rain barrels, in pools and puddles almost anywhere. *Aëdes (Stegomyia) calopus* will be found in artificial containers about houses. Anopheles will be found in the clean, shallow, shady, grassy pools described. The first two can be seen at once and recognized as not being Anopheles by their position, hanging head

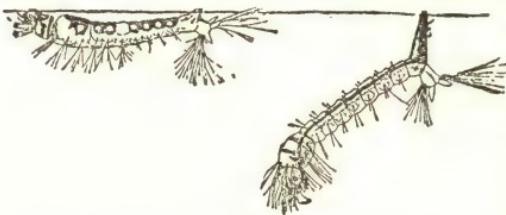


FIG. 22

To the left, larva of the Anopheles mosquito to the right, larva of the Culex. Note that the larva of the Anopheles lies almost parallel to the surface of the water while the larva of the Culex hangs down. (Magnified many times.)

(From *A Short Catechism on Malaria*, with the permission of the Virginia State Board of Health.)

in the grass, so they are sometimes not so easy to see even when present. The best way to get them is with a dipper and a white saucer. *Dipping* in the water unless you see larvæ is not the best way; make a quick stroke, just skimming the water towards the edges of the pool. Carry it into the grass, because the larvæ are in the grass. Do not make this stroke until you have given the larvæ time enough after you arrived to dive and come to the top. Another way is to press the edge of the dipper suddenly under water, so that the stream of water running into it may wash the larvæ into the dipper. Pour the contents of the dipper into the saucer and you will see the larvæ against the white ground. The young Anopheles are light gray, banded with black and very slender. The older ones are red, green, black, etc., the color depending

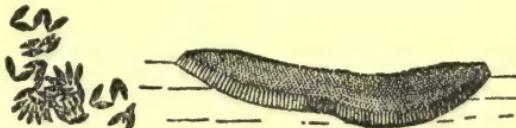
downwards. If one leans over a pool containing Anopheles and waits a little he will be able to see these larvæ lying flat at the surface of the water. He must wait a little, however, as they are apt to dive when one approaches them; also they frequently run to the edge and hide

on what they eat. They are less slender. All are quick in movement, and although they will dive, yet they also dart along the surface of the water, which the others never do. Some are extremely small.

The eggs of *Culex* are easily recognized, being brown rafts half as large as the nail of one's little finger. The eggs are set on end in the mass. They are common on water barrels. *Anopheles'* eggs are in loose groups, the eggs lying flat on the water singly. They are very much harder to find and require a hand magnifying glass. They are usually demonstrated by keeping *Anopheles* mosquitoes

in a jar with water at the bottom, on the surface of which they will deposit their eggs. Eggs may also be found in nature on the surface

FIG. 23



To the left the eggs of the *Anopheles*; to the right the eggs of the *Culex*. You will seldom find the eggs of the *Anopheles* clumped together. The eggs of the *Culex* generally are found in "rafts" as shown in the cut to the right. (Much enlarged.) (From *A Short Catechism on Malaria*, with the permission of the Virginia State Board of Health.)

of water containing many very young larvæ. Dip this up in a saucer and examine with a hand glass.

Keep them in a vessel with a wide mouth — fruit jar, candy jar, etc. — half full of water or less, with pieces of grass in it extending above the water. Cover it with mosquito netting and some of them will develop into mosquitoes, and you can tell the kind. The larvæ are cannibals, and the

FIG. 24

To the left the *Anopheles* or malarial mosquito; to the right the *Culex*, the common non-malarial mosquito of this climate. Note that the palpi of the *Anopheles* are almost as long as the beak while the palpi of the *Culex* are much shorter. Note also that the wings of the *Anopheles* are spotted and dusky while the wings of the *Culex* are almost clear. Both these mosquitoes are females, largely magnified.

(From *A Short Catechism on Malaria*, with the permission of the Virginia State Board of Health.)

big ones eat the others. *Anopheles* are much harder to raise than *Culex*, and unless one starts with nearly full-grown *Anopheles* larvæ or pupæ it is difficult to develop the mosquitoes from them

unless one takes a pan or trough and makes enough of a marsh to imitate natural conditions. Some of the points of difference of mosquitoes and larvæ can be seen with the naked eye, but a good hand lens is of great assistance and makes the study much more attractive.

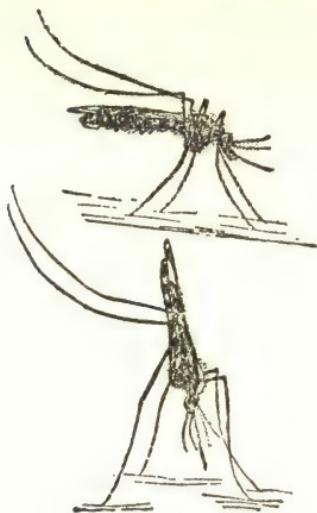


FIG. 25

Above, the *Culex* mosquito in a resting position; below, the *Anopheles* resting. Note that the *Culex* is humped up; the head of the *Anopheles* hangs down. (Much enlarged.)

(From *A Short Catechism on Malaria*, with the permission of the Virginia State Board of Health.)

The pupils should be encouraged to do such antimalarial work as is practicable to them. That directed against mosquitoes is the most practical; compositions on subjects connected with the lessons; verbal reports — say, weekly — during the malarial season of what each one has done in the way of antimalarial work will increase the interest in this subject. The fuller the knowledge the teacher has of the subject, and the more it is explained and developed the more the pupil will be interested and will profit.

Children may help to solve problem. Screening the school-house against flies will also be a precaution against mosquitoes, but to get at the seat of the difficulty the breeding-places must be destroyed. Often there is stagnant water on

the school-grounds that can be drained or oiled by the children. The explanation of oiling may be presented by putting mosquito larvæ into two different glass cans partially filled with water. Oil being poured on one, the children will readily observe what takes place. Each child may be asked to do something at home to prevent the mosquito from breeding. It will add to the interest of the pupils if they write compositions on their experiences in studying the mosquito or on what they have done to solve the problem at home.

To get children interested in the plan of work which is outlined here, the teacher should make a careful study of

the mosquito referring to as many good books and pamphlets on the subject as can be secured. Much material may be secured free. The plan of campaign suggested here will do much to dispel the notion that hygiene is a dry subject.

The louse as a carrier of disease. These insects, usually referred to in medical literature as "pediculi," are, during their entire life, parasites on warm-blooded animals, especially man. The blood-sucking habits of these creatures make them troublesome, dangerous, and capable of transmitting disease. They are now known to transmit typhus fever and they are also suspected in relapsing fever and other infections.¹

Instruction of children as to lice. In all clean American families it is looked upon as disgraceful to have lice, but in some localities children may come to school with both heads and bodies infected. In many city schools there is a regulation that as soon as such a condition is observed by teacher, school-nurse, or physician, the child shall be sent home until the infection is removed. In rural districts, where there is no law and precedent behind the teacher, this course may be impossible and unwise, but children may be informed about the dangers from lice and how they may be eliminated. This is also a topic which might be discussed at parent-teacher meetings.

The presence of lice is due largely to personal uncleanliness, although anybody may become infected by sleeping in a strange place or by personal contact. In the case of the body-louse, clothing should be boiled, baked, or steamed. Clothing injured by heat may be subjected to sulphur fumes or dipped in a carbolic-acid solution. It is comparatively easy to rid the head of adult insects, but the eggs are resistant. Boys with badly infected heads should have their hair

¹ The latest news from the Western battle front reports that the louse is a carrier of trench fever.

cut short. The hair may be made free from lice by rubbing equal parts of kerosene and olive oil into the scalp, covering the head with a piece of muslin. In the morning the scalp should be washed well in hot water and soap and the hair combed with a fine-toothed comb wet in vinegar to remove nits. This treatment should be repeated for two or three nights.

Dangers from other insects. Any kind of insect which bites a human being or crawls over his food may be suspected of carrying infection, and measures of prevention should be taken against them. The flea is now known to carry the dreaded Bubonic plague, and the bedbug is suspected of carrying tuberculosis, leprosy, and other diseases. Cockroaches, ants, and other insects known to frequent insanitary places and then come in contact with our food are to be feared and properly dealt with. All food should be protected from dust and vermin.

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4. *The Filthy Fly as a Disease-Carrier.* State Board of Health of Maine, Circular 122, Augusta, Maine.
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Excellent for teachers, contains illustrations and much practical information.

6. R. H. Hutchinson. *A Maggot Trap in Practical Use; An Experiment in House-Fly Control.* United States Department of Agriculture, Bulletin No. 200.

Interesting account of a trap which caught ninety-eight per cent of the larvae breeding in the manure of a horse stable. Illustrated.

7. *Malaria; Its Cause and How to Prevent It.* Metropolitan Life Insurance Company, New York.

A brief, excellent discussion of the malarial mosquito and how he may be destroyed. Could be read by pupils.

CLASS EXERCISES

1. Examine the latest report of the State Board of Health in your State for information on the fly problem. What material might be useful to teachers? Explain just how you would use it.
2. Plan for an eighth grade a half-dozen lessons on the fly.
3. Compare two series of textbooks in hygiene for children with reference to the treatment of the fly problem. Which is better? Why?
4. Give all the different reasons why you think the life-history of the fly should be studied. Would these same reasons apply to the study of the life-history of the mosquito?
5. How many of the rural schools with which you are familiar are located in communities where malaria is prevalent? To what extent have the teachers in these schools been leaders in these communities? What did the schools fail to do that in your judgment might have been done?
6. In your visits to rural schools, observe how many buildings you find that are properly screened against the fly and mosquito.
7. Arrange the details of a fly-catching contest to be carried out by upper-grade children.
8. Make a plan of enlisting the coöperation of the community in exterminating the flies; the mosquitoes.
9. Visit a number of rural schools and find out what the teachers are doing or intend to do in regard to instruction on the fly. Does such instruction seem to be effective? Why?

CHAPTER IX

WAR ON RATS AND MICE

The most serious indictment against the rat is the destruction of human lives caused by it as a carrier of diseases fatal to mankind.
(Edward Howe Forbush.)

THE movement throughout the entire country, especially in our large cities, to destroy the rat is secondary in its importance only to the campaign against the house fly. In many ways the rat is even a greater enemy to man. Forbush, in his interesting and fascinating bulletin on *Rats and Rat Riddance*, has this striking introduction, which gives adequate reasons why the rat problem is one that schools should help to solve:

With the lapse of ages the rat has become a parasite on man. It has developed into the greatest rodent pest ever known. It is far more destructive, directly or indirectly, to human life and property than any wild beast or venomous serpent. It appropriates nearly everything that man eats, and drinks many of his beverages. It follows him with its baleful influence from the cradle to the grave. It destroys his poultry and molests his domesticated animals. It has been known to attack and mutilate infants, sleepers, the sick, aged, and infirm. It is the forerunner of famine, pestilence, and death. It carries the germs of disease. It infects man's ships and habitations with the dreaded plague; sets fire to his dwellings and ships, and ceases its ravages only when the house burns or the ship sinks. As if not satisfied with pursuing him through life, it follows him in death, desecrating and mutilating his mortal remains.

Rats numerous and destructive. Probably few people realize how many rats infest their premises. Farmers and householders when questioned usually admit that they have a few rats, but careful investigation often shows that they sustain a loss from them equal to their taxes. There are

always many more than are seen by human eyes. The conditions on the farm, where there is plenty to eat in the field and where there are poorly built and ill-cared-for granaries, are especially favorable for rats. Where a campaign has been begun on farms and plantations it has not been uncommon to catch and kill hundreds and even thousands of them. Rats often swarm in fields of grain destroying a whole crop. They usually eat only the softer part of a kernel of corn and waste the rest. Large portions of other crops, like wheat, rye, barley, oats, etc., are taken by rats and mice in the fields. Rats often infest unthreshed grain in barns, and if left alone will destroy most of it. Fruits and vegetables when stored in buildings and cellars are eaten by them. The writer has known of a winter's supply of potatoes to be almost entirely spoiled by them. The damage done to buildings by rats is incalculable. They gnaw the underpinning and cause the decay of sills, floor-timbers, and floors by bringing them in contact with fresh dirt. Rats are held responsible for a famine in India following the year 1879. It would take many pages to enumerate the damages perpetrated by the rat without any consideration of the greater damage to the public health.

The cost of keeping a rat. It is estimated by Surgeon R. H. Creel, of the United States Public Health Service, that one half cent a day (\$1.82 a year) is a conservative figure of the cost of keeping a rat.¹ It is probably a poor farm that does not support fifty or more rats. At this minimum estimate a farmer would lose ninety-one dollars annually. The loss to the whole country must be enormous. If we assume that there are only as many rats as there are people in the United States, on the basis of the *per capita* cost estimated above, the rat costs our country \$182,000,000 per year. Any esti-

¹ This estimate was made before the advance in the cost of living; it costs much more now to keep a rat.

mate of this kind is largely guesswork, but nobody who is familiar with the actual damage done by rats, would suggest a smaller loss.

The rat a menace to health. The economic loss due to the rat would be a sufficient reason for his extermination, but there is still another more important motive, for the rat is responsible for that dreaded scourge, the Bubonic plague, and other diseases. The plague has a history going back to Bible times. Probably the worst outbreak of this malady occurred between the eleventh and the fourteenth centuries when the "Black Death" devastated Europe. Within the last eighteen years this same plague has caused the death of over 7,000,000 people in various parts of the world. It has made little progress in this country because of the careful work of our public health authorities. The disease seems to be essentially a disease among rats. It is communicated from one diseased rat to another and to man by fleas. Fleas, abandoning a rat dead of plague, bite human beings and so inoculate them with the disease. Often the plague is carried from one country to another by rats which conceal themselves on board a ship and then escape when it reaches port. There seems to be little danger of the plague being communicated from one person to another if ordinary precautions as to isolation, special hospitals, etc., are intelligently carried out, but if the malady spreads among the rats it results in most serious consequences. In San Francisco and New Orleans, where the plague in this country began, it was quickly exterminated through the brilliant work of the United States Public Health Service in destroying promptly all infected rats.

Rats are also likely to carry the germs of other diseases because of their habits of frequenting privies, drains, sewers, underground passages, and other filthy places where they can find food.

Dissemination of information about rats and rat riddance through the school. Several States have offered a bounty on rats, and boards of health, women's clubs, and civic organizations have launched a vigorous warfare against them. It is clearly the duty of the school to help the good cause along. This can be accomplished by planning definitely to take up this problem in the course of study. Children should have all necessary information about the danger from the rat and the methods of rat riddance. If the school textbooks have nothing on this question, the teacher, after informing herself thoroughly, may present the significant facts to the children orally, or, better still, she may get a number of free bulletins and distribute them among the older children. Lessons may be assigned from them as from a regular textbook. If children are allowed to keep such bulletins and take them home, the parents are also likely to be interested and even do something to rid their premises of rats.

Methods of rat riddance. It is impossible to do more than touch briefly on this important topic. For further information the reader is invited to consult the references at the end of this chapter.

There is no one method that can be relied upon to exterminate rats. One of the usual methods about a farm is to keep cats. Opinion seems to differ as to the efficiency of the cat as a ratter. Most authorities belittle the cat as a rat-catcher. While they may keep down the number of rats, it is improbable that they will entirely free a farm of them. Then, too, only a small proportion of cats will catch rats.

Another popular method of extermination of rats is that of poisoning. Where rats are plentiful, poisons are economical of time and money; but there is always some possible danger to man and domestic animals by its use. Where there are little children the use of poison is dangerous. A number of reliable rat poisons are on the market.

The intelligent use of traps will practically free any home or farm of rats. The rat is one of the wariest of animals, and many people who have tried to trap rats complain that their trap won't catch them. There are many traps on the market, but success, as Forbush intimates, "depends more upon the trapper than the trap." No matter how good the trap and how attractively it may be baited, rats cannot be caught so long as they have plenty to eat. One of the first things to do,

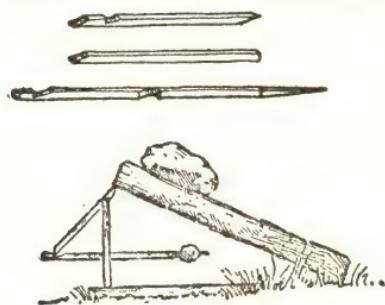


FIG. 26. "FIGURE 4" TRAP AND DETAILS OF CONSTRUCTION

Sometimes a weighted deadfall will kill a cautious rat. A bit of plank, well weighted, supported with a "figure 4" trigger, built to "throw clear," covered with straw and enticingly baited, may do the business. This is the kind of trap any boy would like to make.

(From *Rats and Rat Riddance*. Reproduced with the permission of the author.)

from the human hand. It is even desirable to scent the gloves with a drop or two of the oils of anise, caraway, or rhodium which overcome the human scent.

There are other methods which may be used such as fumigation, drowning, clubbing, shooting, etc. One of the best things to remember is this: rats will not stay in a place where they can get nothing to eat. Food should not be exposed. Buildings should be made rat-proof.

Training children to catch and kill rats and mice. The teacher should not be content to know that children have

then, is to remove all loose food and garbage and see that everything edible is put into a secure place. The much-used steel-trap is one of the poorest because it may injure children and domestic animals. All traps when used should be kept clean and concealed as much as possible. Before setting a trap, it should be well cleaned with plenty of hot water and a brush and dried before the fire. The trap should be handled with gloves, as rats can detect the odor

DO YOU WISH TO GET RID OF RATS?

Starve them — keep the cover on the garbage-can.

Deprive them of nesting-places — clean up rubbish-piles.

Trap them — use several, cleaned, scented, concealed traps.

Poison them — if you do not fear the risk.

Stop up their holes — use a mixture of cement, sand, and broken glass, first sprinkling chloride of lime in the holes.

Leave no opening unguarded — fill up holes around pipes and wires, and cover ventilators, skylights, and cellar windows with half-inch wire netting.

Make your building rat-proof — use concrete, sheet metal, or wire-netting; or raise the building at least two feet above the ground leaving the space beneath open.

Coöperate with all who try to exterminate rats.

REMEMBER

That rats can swim half a mile, burrow nearly three feet, or jump nearly two feet.

That they climb by means of rope, tree, or vine.

That they multiply rapidly.

That they cause fires by chewing matches, by eating into gas-pipes, and by gnawing the insulation from electric wires.

That they carry disease.

IF THERE ARE RATS ON YOUR PREMISES, THEY ARE THERE BECAUSE EITHER YOU OR YOUR NEIGHBORS FEED AND PROTECT THEM.

**THE WOMEN'S MUNICIPAL LEAGUE
OF BOSTON¹**

¹ Poster used in Boston's campaign against rats. Reproduced with the permission of the Women's Municipal League of Boston.

been well informed as to the dangers from rats and how they may be destroyed. It might be regarded as a part of the school work for every older pupil to catch or kill at least one rat. There might be a contest in which the pupils would be divided into two equal groups. On the blackboard or on a sheet of paper hung on the wall there could be a daily record kept to arouse competition. Around nearly every farm there is at least one rat-trap which is seldom used because "the rats are too sly to be caught." There is no reason why rats cannot be caught if the trap is properly used. If traps are not available at home, cheap and reliable traps may usually be purchased at any general store. The flat trap, which may be secured for five cents at the five and ten cent stores, is not so strong but that a rat will occasionally get out of it, but if sufficient numbers are properly baited they will usually clear a house of rats.

In some of the counties of the Middle West a day has been set aside to kill rats and has been quite generally observed. Every teacher may do something to make such an occasion successful through the distribution of circulars and by enlisting the efforts of the school. (See illustration opposite.)

If the study of the rat problem is well conducted, we may expect finally that pupils will have a loathing for the rat as great as that for a poisonous snake, and that they will really "do their bit" to help solve the problem of rat riddance.

Although the mouse has never been convicted of carrying the plague, there is no doubt that his filthy habits make him a carrier of disease. Then, too, in proportion to his size, the mouse is equally as destructive to the property of man as is the rat. Cases have been known where mice have completely destroyed fields of grain. In the interests of both wealth and health the mouse, like the rat, should be destroyed.



**ONE WAY IN WHICH THE SCHOOL MAY HELP THE COMMUNITY TO BE
MORE HEALTHFUL AND ALSO CONSERVE ITS FOOD SUPPLY**

Note each boy in this school has killed a rat.

(From Forbush's *Rats and Rat Riddance*, with permission of the author.)



THE BUBBLING DRINKING-FOUNTAIN IS THE ONLY REALLY
SAFE WAY OF PROVIDING DRINKING-WATER
FOR SCHOOL-CHILDREN

(Courtesy of the Waterman-Waterbury Company.)

The cat and sanitation. It is doubtful whether in the interest of health and economic prosperity the continued existence of the cat can be logically defended. Almost at the dawn of human history the cat was the companion of man and has shared his fortunes from that day to this, even to having his diseases and infecting mankind. Dr. Caroline Osborne, in an extensive study of the cat in relation to disease, shows that the cat is susceptible to all species of disease germs which plague mankind. In many cases there is positive proof that the cat has transmitted disease to man, and the circumstantial evidence is overwhelming in pointing out the cat as one of the most dangerous carriers of disease to man. That she has the disease is enough to make us look upon her with suspicion. Knowledge of her habits and her close association with human beings forges the additional links in the chain necessary for her conviction. She is a universal scavenger, bringing in dead and decomposed birds and mice as well as those freshly caught. Cats left to themselves will visit the most obnoxious receptacles, thereby contracting some of the most serious feline diseases. She loves to roll in the dirt and in the disposal of her excreta digs in the dirt, getting dirt into her claws and so making it possible to inoculate with various diseases by her scratch. When we consider the whole range of territory that the cat covers, especially the poorly fed cat forced to forage for her food, and her intimacy with members of a family, especially with children, it is questionable whether the cat is a desirable pet.

Since children, who are likely to handle a cat a good deal and come into close contact with it, are peculiarly susceptible to the diseases which the cat may carry, the writer believes that it would be better not to have a cat at all, or, if a cat is kept, as Dr. Osborne has suggested, she should be kept away from sources of infection or from people having

disease. A cat known to be infected should either be disposed of or kept away from children. Stray cats, if they are harbored, should be cared for with the thought in mind that they may be infected.

The foregoing information and suggestions, not found in the ordinary school textbooks, the writer believes should be presented in all schools. It could best be taught, perhaps, in connection with the rat.

The keeping of the cat has usually been defended on economic grounds, namely, that she catches rats and mice. Careful investigation shows, however, that comparatively few cats habitually attack rats and that traps are more effective than cats in catching mice. Investigation proves that the cat, instead of being an economic asset, is a positive economic burden. Forbush sums the matter up thus:

It is a member of one of the most bloodthirsty and carnivorous families of the mammalia, and makes terrific inroads on weaker creatures. It is particularly destructive to certain insect-eating forms of life, such as birds, moles, shrews, toads, etc. Every year the cats of New England undoubtedly destroy millions of birds and other useful creatures, therefore indirectly aiding the increase of insects which destroy crops and trees. Such insects possibly cost the people of Massachusetts from seven and one half million to nine million dollars annually. The cat protects them, thus increasing the cost of living to every citizen. The good that cats accomplish in the destruction of field mice, wood mice, and insects is of little consequence beside the ravages they inflict among insectivorous birds and other insect-eating and mouse-eating creatures.

Public opinion is not ready now and may never be ready to dispose of cats entirely, so the school should tell the truth about them and the way they may be controlled. Forbush suggests that this can be done by reducing the number of cats to a minimum, limiting breeding, destroying superfluous kittens at birth, restraining or confining cats kept as pets and as ratters (particularly at night and during the

breeding-season of the birds), quarantining cats in cases of infectious diseases, and destroying all stray and feral cats, wherever they may be found.

Teachers will find the scholarly and fascinating bulletin of Edward Howe Forbush, *The Domestic Cat* (Economic Biology Bulletin No. 2, State Board of Agriculture, Boston, 1916, pp. 112), of unusual interest and value.

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A plain presentation of the relation of the rat to the plague.
3. R. H. Creel. *The Rat — A Sanitary Menace*. United States Public Health Service.
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5. David E. Lantz. *How to Destroy Rats*. United States Department of Agriculture, Farmers' Bulletin No. 369.
A practical bulletin; very useful for teachers.
6. S. E. Piper. *Nevada Mouse Plague of 1907-08*. United States Department of Agriculture, Farmers' Bulletin No. 352.
Reveals the almost unbelievable damage done by mice. Would interest a rural community.
7. *Rats — Kill Them*. Virginia Health Bulletin, vol. vi, extra no. 7.
Makes the amazing statement that rats cost the State of Virginia half as much as it costs to run the Government. Presents clearly and briefly the minimum amount of knowledge that every school-child should possess.
8. *Health of Home and School*. Leaflet no. 22, State Board of Health of Maine, Augusta, Maine.
Devoted to the practical problem of how to catch rats.

CLASS EXERCISES

1. Is there any bounty in your State for killing rats?
2. Write to your State Board of Health for printed matter on rats and rat riddance.
3. Suppose that it costs \$1.82 to keep a rat for a year and that there are as many rats in your State as there are people, what is the loss of the people of the State? If this economic loss were represented in bushels of apples or potatoes or some other commodity, what would it mean?
4. Write a composition of five hundred words stating just why you think children should be taught about the danger from rats and rat riddance.
5. Look up the history of the Bubonic plague in San Francisco; in New Orleans.
6. Arrange a rat-exterminating campaign among your older pupils.
7. What percentage of the cats which you have had in your own home actually caught rats?
8. Arrange some experiment to determine whether a particular number of cats is as effective in catching rats as an equal number of traps.

CHAPTER X

HEATING AND VENTILATING

The one reform which perhaps more than any other, except possibly greater cleanliness, is obviously needed in our schoolrooms, is a lower temperature. *(Dr. W. H. Burnham.)*

In ventilating we ought to *ventilate the people in the room*, as well as the room itself. This can be done successfully only by turning the people out of doors every two or three hours if grown-ups, and every hour or so if children. *(Dr. Woods Hutchinson.)*

HEALTH and efficiency are directly related to the condition of the air we breathe and the air which surrounds our bodies. The condition of the air in our rural schools is usually quite unsatisfactory. This is due in part to improperly built schoolhouses, in many cases constructed many years ago before hygiene and sanitation were emphasized, and to improper equipment. The teacher is also responsible for much of the unsatisfactory heating and ventilating because she does not control the heating and ventilating in the most intelligent way. Even in a badly built and poorly equipped schoolroom, the teacher may do much to relieve the conditions, which are too often intolerable.

Usual conceptions of healthful air. Little more than a decade ago it was assumed by the ventilating experts that air was healthful if it was kept at a uniform temperature (about seventy-two degrees), contained no more than three parts of carbon dioxide in ten thousand, and was free from drafts. A system of ventilation which could insure this condition of the air was referred to as ideal. The most recent investigations tend to demonstrate that no system of heating and ventilating can furnish air to any living-room which is as healthful as outdoor air, and that air once considered healthful is far from being ideal.

Experiments to determine healthful air. Instead of accepting blindly the old standards of heating and ventilating, patient investigators have put those standards to a test to find out what conditions could be proved to be best for the worker. There are many problems of detail that have not yet been solved and numberless investigations are still going on; nevertheless, there are a few fundamental principles that have been evolved which seem likely to stand the future tests of time.

Ordinary experience in being in a crowd in a close room is far from agreeable. The results produced are drowsiness, headache, nausea, dizziness, faintness, lassitude, etc. As it was well known that oxygen is necessary for life and carbon dioxide is a waste product of the body, the belief naturally grew that the symptoms mentioned were due to an abnormal amount of this poisonous gas and a lack of oxygen. Hence the efforts to test the air so as to regulate the amount of carbon dioxide. But this theory, logical as it seemed, was eventually to be revolutionized. The most recent developments in experimental hygiene seem to prove that the amount of carbon dioxide in the worst kind of air is not responsible for the illness and even death resulting from bad ventilation.

The theory of the harmful effect of carbon dioxide was put to a practical test by enclosing people in air-tight cabinets while the effects of various conditions of the air upon the inmates were noted. Dr. Paul found, for example, that when the temperature was as low as sixty degrees the experimenter could stay in the cabinet for four hours without any noticeable signs of discomfort, although the oxygen of the air breathed was lower and the carbon dioxide higher than would be found in the worst-ventilated room. But a few minutes after the temperature was raised to seventy-two degrees there were signs of faintness, headache, and

other discomfort. When an electric fan was started these symptoms immediately disappeared. When the air was kept cool and in motion, as was shown by other investigators also, there were no ill effects from breathing air which contained twenty times the amount of carbon dioxide found in badly ventilated houses.

In a number of noteworthy experiments, Hill proved that breathing hot and vitiated air seemed to have no relation to the symptoms. Individuals standing outside of the cabinet were able to breathe the inside air without any ill effects. He also found that those within the cabinet were able to get no relief by breathing the fresh pure air outside. Fans and lower temperature alone brought relief. Apparently it was not the nature of the air breathed, but the condition of the air surrounding the body which was most important.

How the body maintains a constant temperature. We need at this time, perhaps, some explanation of these experiments. A little study of physiology will be necessary first. One of the remarkable characteristics of the human body is its constant temperature. No matter where man may be found, whether it is in the frozen Arctic regions of the north or in the tropics, the bodily temperature remains the same, about ninety-eight degrees. This is highly significant in the life of man, for it enables him to adjust himself to practically every part of the earth's surface. If he were cold-blooded, and his temperature was regulated by the surrounding air, he would hibernate in winter like some of the lower animals. The maintenance of this constant temperature is made possible by a very delicate kind of control within the human body, a mechanism which cannot be described in detail here.¹

If the body, through exercise or a heated environment,

¹ See Hough and Sedgwick, *The Human Mechanism*, chap. xii.

tends to get warmer than the normal temperature, the body is cooled in two ways. The controlling nervous system brings about the dilatation of the blood-vessels of the skin and the constriction of those of the internal organs. As a result, the blood rushes to the surface of the body.¹ The body then tends to throw off its excess heat into the outer air in much the same way that a heated stove warms a room. The possibility of doing this depends on the temperature of the air surrounding the body and the clothes worn. The nerves also stimulate the sweat glands so that a secretion is poured out upon the skin. The evaporation of this perspiration cools the body.²

Conditions favoring evaporation make the body cool and comfortable. On days when the thermometer registers a high temperature, but when the air is dry and a breeze is stirring, there is little discomfort.³ Conversely when the air is still and heavy with moisture (muggy), so that the perspiration of the body is not evaporated, we feel uncomfortable. Under such conditions the blood is drawn to the skin and away from the brain and internal organs, thereby seriously interfering with their work and producing faintness, laziness, and other symptoms. When the body is overheated, as in the case of sunstroke, even death may result.

An interpretation of experiments. We are now in a position to interpret the experiments in connection with the cabinets. As long as a person is in an air-tight cabinet where the temperature is low, there will be no discomfort because

¹ Witness, for example, the gorged blood-vessels of the hands on a hot day. We sometimes say that our hands are swollen.

² Wet the back of your hand with a little naphtha, which speedily evaporates, and notice how cool the hand feels. Notice how cool the kitchen is after it has been mopped even with warm water.

³ Notice how much faster the ground dries after a rain if the air is dry and moving.

the body is able to maintain its constant temperature. When the temperature increases, the constant temperature is maintained with difficulty and so the inmate is uncomfortable. The movement of the fan helps because the air next to the body of the inmate becomes saturated with moisture from the breath and the evaporation of the perspiration. The fan dispels this blanket of humid air and brings to the surface of the body drier air which makes evaporation again possible and the body is cooled. The person in the hot, vitiated air of the cabinet gets no relief by breathing the outside air because his bodily temperature remains the same. Conversely the person outside of the cabinet feels comfortable because he is able to maintain the normal temperature with ease.

Optimum temperature of greatest importance in ventilation. Contrary to the traditional notion that the amount of oxygen in the air breathed determines its value for breathing purposes, it has now been demonstrated that neither the amount of oxygen nor carbon dioxide in the air available for breathing has any appreciable bearing on ordinary ventilation. The Ventilation Commission of New York finds that if the air is kept cool, moist, and in motion in an experimental chamber, there is no measurable effect on mental or physical activity. However, there is a loss of appetite. Some authorities believe that ventilating apparatus may be constructed so that the rebreathing of the air may be carried on to advantage. The possibility of the practical application of this theory, even if true, in the rural school, is, of course, a remote possibility. This commission sums up the whole matter by saying that "the thermometer is the first essential in estimating the success of ventilation." A large number of the more recent experiments on ventilation are emphatic in pointing out that a suitable temperature is absolutely essential for the life of a human being.

Dr. Burnham¹ epitomizes all these experiments by saying, "If the body is exposed to a high temperature for a long time, especially with great humidity, which hinders the evaporation from the skin and the cooling off by this means, then the bodily temperature rises and serious nervous symptoms may appear, at first a feeling of discomfort and sleepiness, and finally heatstroke."

The necessity for maintaining a temperature in the schoolroom between sixty-five and seventy degrees was well shown in reports made by Superintendent Hines at Crawfordsville, Indiana. Burnham refers to Hines's observations as follows:

"Temperature of eighty degrees, the class was restless, dull, and incapable of continued mental effort; seventy-six degrees, the class was dull and sleepy, penmanship was poor; seventy-five degrees, class was dull and complained of the heat; seventy-four degrees, not quite so dull as above; seventy-two degrees, restless; seventy degrees, excellent work, cheerfulness in class; sixty-eight degrees, best work, to-day seemed their best; sixty-six degrees, splendid work; sixty-five degrees, class happy and full of work, some complained about the room's being cold; sixty degrees, too cold for good work, complained of the cold."

Such observations as those made by Hines show most decidedly that if the teacher is to have favorable conditions for work in the schoolroom, the optimum temperature of about sixty-eight degrees is a necessity. *Every schoolroom needs a thermometer.*

The importance of drafts. It is now thought by all modern hygienists that not only should the air of the schoolroom be about sixty-eight degrees, but that everybody should accustom himself to drafts. The old theory that drafts cause colds is now exploded. Colds are caused by the

¹ W. H. Burnham. "The Optimum Temperature for Mental Work"; *Pedagogical Seminary* (March, 1917), vol. xxiv, pp. 53-71.

presence of germs. Hunters, trappers, and explorers, exposed to all sorts of drafts both in waking and sleeping, seldom have colds. If we were to accustom ourselves to drafts we should have fewer colds. As it is, we educate our heat-regulating apparatus so little that when the body encounters a change in temperature it cannot adjust itself to the situation. The body is then cooled so rapidly that if the cold germ is present we catch cold readily. Children exposed to drafts in open-air schools do not usually catch cold. The stagnant air in our schoolrooms is not conducive to health. This condition of the air may be corrected somewhat by keeping some of the windows slightly open at the top and bottom. The hot air then rises and passes out at the top while the cool air comes in at the bottom. Cross ventilation, except on very windy days, may be secured by opening windows on opposite sides of the room. Windows should always be open, the degree of opening varying with the condition of the weather. By such methods air may be kept cool and in circulation. Even when a jacketed stove is used some ventilation by means of windows is necessary.

The need of air sufficiently moist. One great evil of most classrooms is the dryness of the air. Cold air with sufficient moisture will expand when heated so that its drying capacity will be enormously increased. This air, often on winter days as dry as the Sahara Desert, dries the membranes of the nose and throat of the children leading to diseases of those organs. Colds, catarrh, adenoids, and enlarged tonsils may result. Dryness of the air also results in irritability and nervousness. Concentration of the attention on school-work becomes difficult and the work drags.

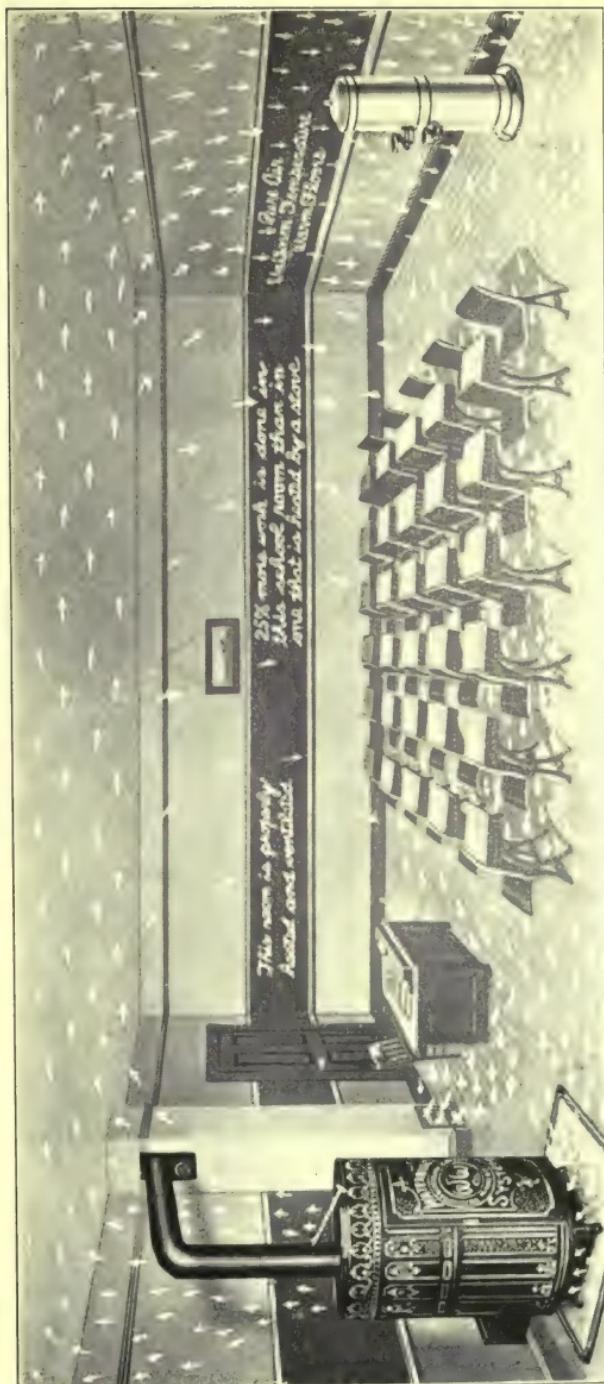
Standards for schoolroom air. In contrast to the older conceptions of healthful air (see p. 183), this standard would now be accepted by most hygienists: the temperature of the air should be about sixty-eight degrees, the air should be

moving rather than stagnant, and should contain as nearly as possible the amount of moisture found out of doors. The open-air school has ideal air. But every teacher needs to know that ventilation is primarily body ventilation. Hunger of the tissues for oxygen results largely from muscular activity. Children do not become strong, healthy, and rosy-cheeked by simply breathing fresh air but through vigorous exercise in the open air. The value of play in the ventilation of the body is immeasurable.

Defects of the common stove. The majority of school-rooms in rural districts are still heated by the ordinary box stove. This is a very unsatisfactory method of heating because the temperature cannot be properly regulated throughout the room. Those who sit near the fire may be too hot, while those in the rear of the room may be chilly. This method of heating is also unsatisfactory because it does nothing to further the circulation of air in the room. The general stagnation of the air can be prevented to a large extent by window ventilation, but too often this is likely to be neglected.

The jacketed stove. The ordinary stove should no longer be tolerated in any schoolroom. By the installation of a jacketed stove much better heating and ventilating is possible. In this kind of stove (see the illustration opposite) both smoke and foul air are carried out through the flue, the foul air passing out near the floor. The fresh air comes in through the intake seen in the rear, is heated, and, rising between the casing and the stove, spreads out next to the ceiling and soon descends to the breathing line. This system brings about the *movement*¹ of the air and its even distribution.

¹ In the light of the experiments mentioned, it seems indisputable that the jacketed stove is superior to the common stove, not because fresh air and oxygen are being brought in constantly, but because the air may be warmed evenly through the schoolroom and also because it is not stagnant.



A GOOD HEATING AND VENTILATING SYSTEM FOR A RURAL SCHOOL.

The arrows indicate the direction of the air. Notice that the heat is evenly distributed over the room and that the air is in motion.

(Courtesy of the Waterman-Waterbury Company.)



A SCHOOLROOM IN WHICH HEALTH IS CONSIDERED AS IMPORTANT AS LEARNING TO READ OR WRITE

(Courtesy of the Waterman-Waterbury Company.)

The schoolroom may also be heated through some form of basement heat, such as hot air (advantages similar to the jacketed stove), steam, or hot water. Because these are used so seldom in rural schools they will not be considered further here.

No kind of heating or ventilating has entirely solved the problem of supplying air with the proper amount of moisture, although certain precaution may be taken.

What the teacher may do. No matter what kind of heating or ventilating equipment may be in use in any given schoolroom, it may be so badly managed that the health, school work, and discipline of the school will be seriously jeopardized. One superintendent of schools, when asked about the interest which his teachers took in the problem of heating and ventilating, said that many of them did not know where the foul air escaped. Unless the teacher knows how the heating and ventilating apparatus works there is little probability of the air in the schoolroom being suitable for the children. This is especially true in rural schools where often the teacher is her own janitor. Since the out-of-doors air is ideal, the teacher should see that the children have as much of it as possible. When the weather is mild, the ventilation of a schoolroom is not difficult. On such days the children should be encouraged to wear coats and sweatshirts and the windows should be left open. During pleasant weather, recesses should be spent out of doors. During such intervals the windows and doors of the schoolroom might well be open to flush the room with fresh cool air. At intervals during the day, when the children seem fatigued and the air in the room seems close and stuffy, the windows should be raised and the children put through gymnastic exercises.

Although putting pots of water on the stove may somewhat relieve the dryness of the air, this method is not alto-

gether satisfactory. The more the air is heated, the more it expands and the drier it becomes. Overheating is, therefore, to be avoided. This is likely to be impossible unless the schoolroom is provided with one or preferably two thermometers which are frequently consulted. Few rural schools possess thermometers, but they cost so little that probably few school boards would refuse buying them if properly approached.

The teacher should, of course, make every effort to heat and ventilate her room as best she can with the equipment at hand, but she should lose no opportunity to impress school officials with the need of a jacketed stove or other needed equipment. Catalogues of up-to-date fixtures for the school may be secured from the Waterman-Waterbury Company, Minneapolis, Minnesota.

Get children to study problems of heating and ventilating. If children are ever to take an intelligent interest in the condition of the air in their own homes, they must study such problems in the school. The older children should learn the essentials about the physiology of respiration, how the body maintains its constant temperature, the importance of this, the desirability of moving air and proper humidity. These topics should not be studied merely from the textbook. All reading should be preceded or accompanied by simple observations and experiments. Some of these have already been suggested in this chapter. Others may be found in books like Coleman's *Hygienic Physiology*, and still others may be devised by the ingenious teacher.

The opportunity to study the heating and ventilating of the schoolroom should not be neglected. If an ordinary stove is used, children may test the air to see if it is moving, and if so in what parts of the room and under what conditions. This may be done by dangling a bit of very light paper from the end of a stick or ruler by means of a thread or a

spider's web. Air currents may also be found by carrying a small smoking torch to different parts of the room and then watching the smoke. Experiments may be made with stove, windows, and doors to find the best methods of regulation. If a jacketed stove is used, children should find out where the fresh air comes in and where the foul air goes out. The vent for the escape of the foul air should *never* be closed.

In the ordinary schoolroom window ventilation is of the utmost importance and can best be studied through simple experiments. The following problems may be solved by pupils through the actual manipulation of the windows and study of air currents: What is the effect of merely opening the window at the top? at the bottom? at both top and bottom? Which method is better for cooling off the room rapidly? Which method is better for comfort? Which gives the best circulation of air? If the wind is not blowing is it desirable to ventilate merely on one side of room or on the two sides directly opposite? Why? When the wind is blowing try ventilating on the sheltered side of the schoolroom and again on the side toward the wind? Which is the better method? Why? Should those who have charge of the ventilation always notice the wind? Try the experiment of ventilating by opening *one* window wide at top and bottom, and at another time by opening *several windows slightly*. Which is the better method? Why? Is it easier to ventilate on a cold or warm day? Why?

Training children in the heating and ventilating of the schoolroom. The reading and experimenting should go hand in hand with actual doing. A committee on heating and ventilating might be appointed to look after the heating and ventilating during school hours. There should be two thermometers in every schoolroom, one on the teacher's desk and the other at the opposite end of the room. These thermometers might be consulted every half-hour by the

committee and the stove or windows manipulated as the occasion demanded. To get the best results, teachers will find it desirable to make a record of its readings and what was done to remedy conditions. Records should be neatly kept on carefully ruled paper and submitted to the teacher for criticism at the end of the day. Opportunity should be given to all older pupils to serve on this committee until the practical problems are solved so far as possible by everybody. Such work could be considered properly as a part of the regular work in hygiene and marked accordingly.

Making window-boards. Opening a window at the bottom and top is a good way to ventilate, but the opening of the window at the bottom is open to one objection. The cold incoming air may strike pupils who sit near the windows so directly before it has any chance to be warmed by mixing with the air of the room, that they will feel uncomfortably cold. This can be remedied somewhat by a window-board which can be readily made by any boy who is handy with tools. A board should be cut as long as the width of the window-sash and then put under the lower sash. This will allow a space between the sashes through which the air may enter gradually into the room above the heads of the pupils and be somewhat warmed before reaching the breathing line. The window-board should not be more than five inches wide as it will shut out too much light. Dr. Dresslar recommends that window-boards be cut into in the middle and hinges be attached so that the board may fold up. This makes it easier for the teacher or pupils to adjust the board to the grooves made for the window frame.

Keep the schoolroom clean. Dust and dirt are a menace to health. Dust irritates the lining of the air passages and also carries disease. One method of keeping down dust is to train children to clean their feet before entering the schoolroom. Children can hardly be expected to do this

unless a foot-scraper is provided and they are trained in its use. The common methods of dry dusting and dry sweeping should not be allowed, as the dust is stirred up so that it is breathed in or it settles on books, walls, and desks, where it speedily comes in contact with the hands and clothing. The dust may be easily removed by sprinkling the floor with clean, moistened sawdust before sweeping. Oily cloths may also be used on floors and furniture. The efforts of the children should be enlisted to keep the schoolroom clean. This is beneficial for the health of the children in school and may establish hygienic habits in the homes.

Assigning home problems. As a part of the regular work in hygiene each pupil might be asked to do something in his own home to improve the heating and ventilating, such as the making of a window-board, ventilating a sleeping-room, etc.

REFERENCES

1. Ayres, Williams, and Wood. *Healthful Schools*. Houghton Mifflin Co., Boston, 1918, chap. viii.
Gives brief review of the latest experiments on heating and ventilating with many practical suggestions.
2. Fletcher B. Dresslar. *School Hygiene*, chaps. xi, xii. The Macmillan Co., New York.
3. Hough and Sedgwick. *The Human Mechanism*, chap. xii. Ginn & Co., Boston, 1906.
Particularly good on the physiology of the body temperature.
4. L. W. Terman. *The Hygiene of the School Child*. Houghton Mifflin Co., Boston, 1914.
Careful summary of experiments. Practical suggestions.

CLASS EXERCISES

1. Describe in detail the way your own schoolroom is heated and ventilated. Are there any defects? How may they be corrected?
2. What arguments would you use to convince a school board that a jacketed stove ought to be installed?
3. Taking conditions such as you find in some particular rural school, plan a half-dozen consecutive lessons on heating and ventilating with

the purpose of training the pupils to manage the heating and ventilating of the room.

4. How does the question of clothing affect the problem of heating and ventilating?
5. In your visits to rural schools take particular pains to note the details of the heating and ventilating system. Observe further whether the temperature is not too high and the air too dry for comfort and brisk work.
6. Write a letter to some standard firm manufacturing heating and ventilating systems, and secure catalogues and folders describing their products.
7. Figure out the cost of converting the stove now in your schoolroom into a jacketed stove. (In most instances this can be done for under twenty dollars.)
8. Consult several text-books on heating and ventilating. Work out in detail experiments such as were suggested on pp. 192-193.

CHAPTER XI

PLAY AND PHYSICAL EDUCATION¹

If school hygiene is to be on the same basis as other school subjects, it must not be for the school alone, but it must establish habits and enthusiasms that will maintain the health in years to come. It is believed that all habits of play in the open air tend to do this.
(S. H. Curtis.)

Muscular activity and health. Muscular activity is absolutely essential to healthy living. While it is true that many who live a sedentary and inactive life do not seem to be injured, yet in the long run, as every student of the problem knows, serious results ensue. The man or woman, who for a long period of years neglects healthful, vigorous exercise in the open air is doomed to have some sort of physical breakdown.

Because of lack of space it is impossible to discuss the value of physical exercise except in the briefest way. Muscular activity not only makes our muscles strong and enables us to influence our surroundings and do the work of the world, but as Hough and Sedgwick have so well explained,² it "*ministers to the health of the body as a whole.*" Physical activity affects the heat-regulating apparatus in a marked way. The excess of heat produced by exercise causes the small arteries of the skin to dilate and those in the internal organs to become constricted. The nervous mechanism which controls this is given a new form of activity and thus receives valuable training in adjusting itself to

¹ For helpful criticism on chapters XI and XII I am indebted to Dr. C. B. Lewis, Director of Medical Inspection and Physical Education, Wilkes-Barre, Pennsylvania, and to Miss Lulu Donovan, Instructor in Physical Education, Boston Normal School.

² *The Human Mechanism*, chap. xvii.

changing conditions of life. The person who leads a sedentary and inactive kind of life will always tend to have a congestion of blood in the internal organs. This is bad, as congestions produce irritation and make colds and catarrhal conditions more common. Muscular activity relieves this congestion. Then, too, muscular activity increases the work of the heart and trains it to overcome unusual situations such as would be involved in climbing a mountain or running for a train. The right kind of exercise also causes one to breathe more deeply, thereby exercising all parts of the lungs and preventing tuberculosis and other lung troubles. The circulation is stimulated so that poisonous matter surrounding the cells of the body is carried away and oxygen and nutrition brought to the cells. Exercise, especially if the muscles of the trunk are involved, has a favorable influence on the digestion, tending particularly to prevent and even cure constipation.

Thus it can be seen that all the vital processes of the body — respiration, circulation, digestion — are helped to do their work through physical exercise. Nor should we forget to notice that mental activity is also affected; for a circulation which carries to every cell of the body oxygen and nutrition makes for clear thinking.

Why country children need physical training. It is commonly thought that country children do not need any kind of physical training, as the work on the farm provides all the exercise that is necessary. This is a fallacy, for the work on the farm has changed materially within a generation. The clearing of the forests and the coming in of machinery have revolutionized the modes of muscular activity. The healthful exercise of swinging the axe to fell the trees of the forest, or to clear away the underbrush, is a thing of the past. The vigorous exercise of ploughing among stumps and stones or swinging a scythe in the hay-fields is no longer

a characteristic of farm life. The ploughs, cultivators, rakes, mowing-machines, binders, headers, and other implements convey the farmer over his land and diminish the amount of his physical exercise. The work that the boy does with his hands is frequently pulling weeds, hoeing, or the like. Such work tends to cramp the chest and bring the shoulders forward. If he drives a team he sits on a seat that has no back and assumes a cramped position. Children on the farm may develop considerable muscular strength, but this is becoming less important each year. There is little exercise which develops vital strength, vigor of heart, lungs, and digestion. Curtis says: "Country boys and girls are apt to be round-shouldered and flat-chested, with forward-slanting heads. Boys who have done much hard work are usually awkward and clumsy, almost without that grace and suppleness that are characteristic of a child who has been trained through play. Country children generally have more stable nerves than city children. Their digestion is commonly good. But they are apt to be deficient in lung capacity and heart development."

Physical education should therefore have a vital place in the rural school.

The value of play. Fortunately for the child and his teachers there is an inborn tendency in children to be physically active. The baby just beginning to creep is obsessed with the inclination to touch, handle, and experiment with things. Children when forced to remain inactive go to sleep. Activity is the fundamental law of childhood. As children grow older they pass from individual play experiences to those involving groups of children and highly organized games like baseball and football.

Play has many values, for play embraces all the life of the child. First of all, play, especially if it is in the open air, is of hygienic value. Fresh air, sunshine, muscular

activity, freedom, buoyancy, joy, all these fundamentals of healthy living are found in play. Racing, romping, happy children, through a variety of mental and physical activities are developing better hearts and lungs and better appetites and are thus laying the basis for a sound body and a healthy mind.

Then, too, children in play come in contact with their fellows, learn to control their tempers, to accept defeat with good nature, to be loyal to their playmates, to subordinate themselves to rules, to strive to gain the approval of their companions. On the playground children learn those great lessons of self-control, self-mastery, sympathy, coöperation, honor, love of heroic deeds, and helpfulness that help to make men and women the truest kind of citizens. The boy or girl who has not played has only half lived.¹

Play is not only constructive, making positively for health, morality, and general education, but it is a preventive of many evils. City schools that have introduced playgrounds have found less trouble with discipline, fewer cases of truancy, and better school work. Communities where playgrounds have been established have had a reduction in juvenile crime. Children are so constituted by nature that they crave action, excitement, and sociability. If these instinctive tendencies do not have a legitimate outlet through play, they are apt to be diverted into harmful and lawless activities. The playground in the city has abundantly justified its existence;² it will do likewise in the rural school and rural community if given a fair chance.

Why country children need to play. Until quite recently

¹ For a sympathetic and fascinating treatment of the educational value of play see Joseph Lee, *Play in Education*. The Macmillan Company, New York.

² Read Patris, *A Schoolmaster of the Great City* (The Macmillan Company, New York) for a charming account of the effect of the spirit of play on a congested school in New York City.

play has been entirely neglected in the rural schools. It was easy to understand why children in the crowded tenements of the city needed to play, but the reasons for play in the country have not been clear to teachers and parents. Curtis goes so far as to say that play is more needed at the country school than at the city school. The farms are getting farther and farther apart and the children are decreasing in number each year so that it is becoming increasingly difficult for children to play except at school. This applies in particular to the team games. Parents in rural regions are likely to think that their children do not need to play ball because they have so much exercise at home. This is not true, as we have pointed out, because the exercise at home is not always conducive to vital strength. Then, too, mental health is almost as important as physical health. Life has grown too hard and serious on the farm; it too often descends to the humdrum. It is the lack of the spirit of play, with enthusiasm, abandonment of self, sanity, and optimism, that is making boys and girls, and even the older people as well, dissatisfied with the country. The rural school can do much for the rural communities by bringing into their lives the spirit of play.

Rural teachers' neglect of play. In few schools do teachers take a real, vital interest in directing play. Children are usually left entirely to their own resources. As a result, children often indulge too much in teasing each other or in other undesirable activities. Instead of well-directed, organized play, with splendid educative and hygienic values, children engage too much in "rough-and-tumble" scramble.

There are several reasons for the teacher's neglect. She may have little appreciation of the value of play, have little of the spirit herself, and know little about the teaching of games. This is, of course, unfortunate, but if the teacher desires, these difficulties may usually be overcome. One of

the first things to do is to buy, or get the school board to buy, one or more books on practical play. I believe that every teacher would be amply repaid if she made some personal sacrifice to add such a book to her library. Any of the following books would be valuable:

Jessie Bancroft. *Games for the Playground, Home, School and Gymnasium.* The Macmillan Company, New York.

W. P. Bowen. *The Teaching of Games.*

George Johnson. *Education by Plays and Games.* Ginn & Co., Boston.

Charles H. Keene. *Manual of Physical Training, Games, and Mass Competitions.* World Book Company, Yonkers-on-Hudson, New York.

William A. Stecher. *Games and Dances.* John Joseph McVey, Philadelphia.

Teachers are apt to find that children have few games to play, and that they will welcome new games. If the teacher can contribute a new game now and then, teach the children how to play it, and take part in it herself, she will find that her efforts will be appreciated, and the children will look to her for direction as they get tired of a game. As the teacher takes part in the play herself, imbibes some of its spirit, and sees the effect on the school, the probability is that she will get a genuine appreciation of play as a factor in mental and moral growth.

Other causes of neglect are lack of space for a playground, absence of play apparatus, and an unsympathetic community attitude. As this chapter will attempt to show, these are not always insuperable obstacles.

Size of the rural school playground. It is to be regretted that the ordinary playground of the rural school is so small. Ordinarily the yard is not more than a half-acre in area. Often the land upon which the school-house was built was given to the district by some private individual, and was the poorest land available or it was bought by the school authorities because it could be purchased for the least

amount of money. I have seen a small school-yard so covered with big rocks that play was almost impossible. Fortunately there is a growing public opinion in favor of larger playgrounds for rural schools. The school authorities of the State of Virginia seldom give their approval to plans for

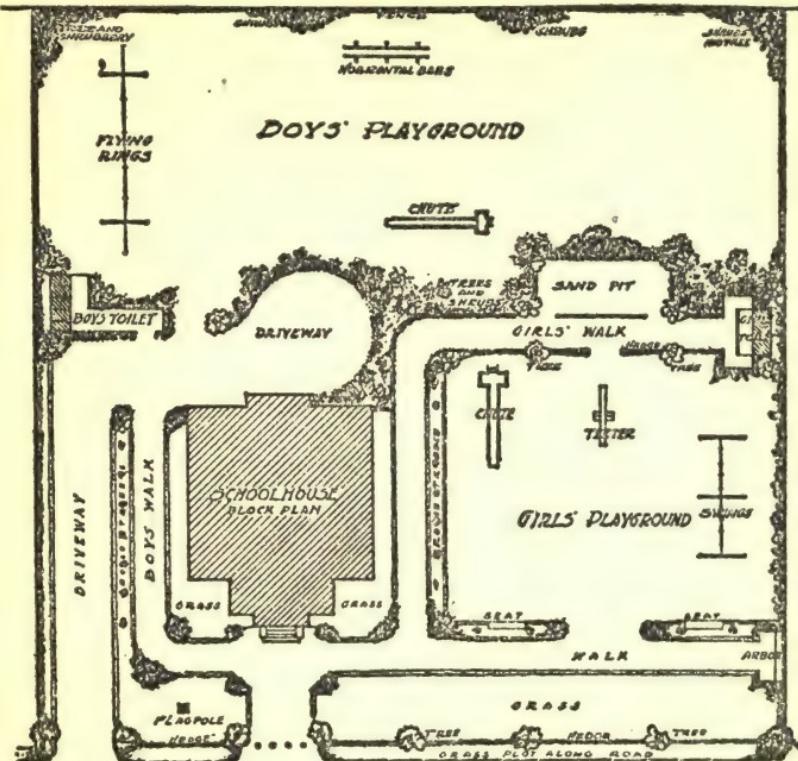


FIG. 27. OREGON PLAN FOR RURAL SCHOOL-GROUNDS

new school-grounds unless they provide for at least three acres. In North Dakota the school law provides that any site for a new school-building must have at least two acres.

There is usually land near rural schools that could be bought at a reasonable price to make the playground larger. The reason that it is not bought is because the community

does not realize that more land is really needed. It is possible for every teacher to do something to make the community realize this need (see p. 226). If the playground is too small, farmers owning fields near the school will usually give permission to play in the fields after the crop is harvested if the teacher will guarantee that no damage will be done. This is, of course, only a temporary expedient, but it will enable a school sometimes to play certain games like baseball during parts of the year. There is at least one thing that every teacher can do: she can study the possibilities of the school-grounds and teach children to play those games which require but small space.

Then, too, there are many games which can be played indoors on rainy days by the whole school. All teachers should have intervals of two or three minutes, with windows open, for exercise during school hours. There are many physical exercises which would be appropriate.¹

Good games for the out-of-doors. Baseball is usually thought to be a typical game for boys of the rural school, yet there are few schools where there are enough boys or sufficient space to play the game. It is a game which girls do not usually play, and they need the exercise far more than the boys, because they are out in the open air less and engage in less vigorous play. Baseball is adapted to exceedingly few rural schools.

Volley-ball is probably one of the very best games for the rural school. It is played with a ball about half as heavy as a basket-ball over a rope or net seven and a half feet high. It requires a court about thirty-five by fifty or thirty-five by seventy feet in size. This may be outlined with a pick. Posts should be set so as to be eight feet above the ground and also to divide the court into two equal spaces when the

¹ See Keene, *Manual of Physical Training, Games, and Mass Competitions*.

net or rope is stretched across. These supplies may be purchased from A. G. Spaulding and Company, 124 Nassau Street, New York City, or through local dealers. If an old piece of cheesecloth or a strip of rope instead of a net is used, the expense will be greatly reduced.

The game is played as follows according to Johnson:¹

Two sides of any convenient number of players are chosen. . . . A player serves the ball from the rear line of the court over the net and into the enemy's field. The ball must be returned before it strikes the ground. Batting upward with the palm of the hand only is permitted. A failure to return the ball in this way over the net and into the enemy's field counts one for the other side. A faulty service — that is serving the ball under the net, or so that it touches the net, or out of the opponent's court, or striking the ball more than once in serving — counts one for the side receiving. If a player touches the net it counts one point for the other side. The side first scoring a certain number of points agreed upon wins the game.

Volley-ball has several distinct advantages. Country children are apt to have inferior chest development, to be stooped and round-shouldered. This game compels the player to keep his head and shoulders back, thus tending to correct these bad positions. It can be played by girls as well as boys, and the girls are really the greatest problems in physical education. Curtis says girls at fourteen have only three quarters of the lung capacity of boys at the same age. Statistics show that tuberculosis is also more prevalent among them. Volley-ball can also be played by children of all ages from eight up. It requires little space, is inexpensive, perfectly safe, hygienic, and involves excellent team play.

Children with the teacher may easily lay out the court, erect the posts, stretch a rope or piece of canvas across, and buy a few balls. It will repay the energy expended.

¹ *What to Do at Recess.* Ginn & Co., Boston.

Indoor baseball is another good game for rural schools. It is not well named, as it is played outdoors more than it is indoors. It is played like regular baseball except that the ball used is soft and measures twelve to seventeen inches in circumference. The diamond is thirty-five feet on a side instead of ninety as in regular baseball. Bases cannot be stolen and the ball must be pitched underhanded.

This game has many advantages similar to volley-ball. It requires little space, may be played by boys or girls, may be played comfortably with five on a side, is safe, and furnishes moderate exercise.

Tether ball is an excellent game for two players. It can be played in a limited space and is therefore especially adapted to small rural schools. The cost of the apparatus is very reasonable. Curtis¹ describes the game as follows:

A post two or three inches in diameter and thirteen feet tall is set three feet in the ground. Six feet above the ground there is a black band around the pole. Attached to the top of the pole is a tether ball (a tennis ball inside a netting sack). A line twenty feet long drawn through the pole divides the ground into courts, and a circle six feet in diameter keeps the players away from the pole. On opposite sides of the pole stand the contestants with tennis rackets. The server takes the ball in his hand and strikes it as hard as he can, seeking to wind it up around the pole above the black line. His opponent on the opposite side seeks to wind up the ball in the opposite direction. Players must not step over the dividing line or inside the circle. The ball is up in the air most of the time and tends to keep the head up and the shoulders back. The player must run back and forth over the space allotted to him and often jump as high as he can in order to reach the ball. There is fully as much exercise in fifteen minutes of tether ball as there is in an hour of tennis. When some skill is acquired it is one of our most interesting games.

Croquet and *tennis* are also good games for the country. They should be played in rural schools, if space permits,

¹ *Play and Recreation for the Open Country*. Ginn & Co., Boston.

not only for the recreation of the pupils, but also to introduce these games to the rural communities.

Games suited to particular grades. There is a large variety of games adapted to children of particular ages. With the permission of the Department of Public Instruction of New Jersey, a few pages of its bulletin, *The Teaching of Hygiene and Safety*, describing games recommended for various grades, is here reproduced. Some of these games may be played indoors. This list is of course quite incomplete. All teachers should have some of the books referred to on page 202.

FIRST AND SECOND GRADES

Bean-bag plays. 1. Pass bags from left to right and return, sitting, and later standing.

2. Pass bags backward on the left side and return, same on right.

3. Pass bags backward over head and return.

4. Tossing (in couples):

Toss with both hands and catch with both.

Toss with right and catch with right.

Toss with left and catch with left.

Take turns tossing into a basket.

Play movements. 1. Warm the hands; rub them together and slap them to rhythm.

2. Warm the feet; stamp in rhythm to music.

3. Warm the body; throw the arms quickly around the chest.

4. Pick apples: raise high on tiptoes, stretch right arm high and bend head backward, pick the apple, and lower the hand; same left.

5. Climb rope: raise right hand high up with head well back, pull the right hand down, and raise the left, and continue.

FIRST GRADE

Squirrel and nut. All the pupils but one sit at their desks, each with head on one arm and the other hand outstretched, palm up. The odd player, called the squirrel, carries a nut and runs on tiptoe

up and down through the aisles. At his discretion he drops the nut into one of the waiting hands. The player who gets the nut at once jumps up from his seat and chases the squirrel, who is safe only when he reaches his seat. Should the squirrel be caught before he reaches his seat, he must be squirrel the second time; otherwise the player who received the nut becomes the next squirrel. It is hardly necessary to say that the players wake up to watch the chase.

Squirrel in trees. Some of the players stand in groups of three with hands on each other's shoulders, forming hollow trees. A player stands in each tree, representing a squirrel. There is one odd squirrel without a tree. The teacher or leader claps her hands, when all the squirrels run for another tree, and the odd squirrel tries to secure a tree. The one who is left out becomes the odd squirrel next time.

Good-morning. One player comes to the front of the room and blinds his eyes. He may do this by holding his hands over them or by placing his head in the teacher's lap. The teacher then silently points to some other player in the class, who rises at once and says, "Good-morning, David," or whatever the child's name may be. The little guesser, if he recognizes the voice, responds with "Good-morning, Arthur," or another name. If he does not recognize the voice at the first greeting it may be repeated twice. Should he fail on the third trial he turns around and changes places with the other player. If he names the right person he retains his place until he fails.

Railroad train. Each player is named for some object on a train, such as engine, baggage-car, dining-car, caboose, etc. One person is chosen to be conductor. He says in narrative form, "We must hurry and make up a train to go to Boston. I will take number 1 engine, some coal, the baggage car, etc." As he names a part the player bearing that name runs to the starter or engineer, who is chosen first, and lines up behind him, each putting his hands on the shoulders of the one in front. When all are on the train the conductor gives the signal for going and the train moves out. At the direction of the starter it goes over some obstacles, under others, around curves, etc. He may have a smash-up at the end. For large numbers there should be several trains started.

Hide the thimble. One player is shown a thimble or other small object and sent from the room. While absent one of those remaining hides the thimble. When the object has been hidden the absent player is recalled and proceeds to hunt for it. While he is doing this

the others sing or clap their hands, the song being very soft or low when the hunter is far away from the object and growing louder when he approaches it.

SECOND GRADE

Automobile race. This schoolroom game is a relay race between alternate rows. The front child in each alternate row, at a signal from the teacher, leaves his seat from the right, runs forward around his desk, then to the rear of the row and back on the other aisle, completely encircling his row of seats until his own is reached again. As soon as he is seated the child next behind him encircles the row of seats, starting to the front on the right side and running to the rear on the left side. This continues until the last child has encircled the row and regained his seat. The row wins whose last player is first seated. The remaining alternate rows then play, and lastly the two winning rows may compete for the championship.

Bean-bag circle toss. There should be a bean-bag for each of the players except two. All the players form a circle separated from each other by twenty inches. At a signal from the teacher each player turns toward his right-hand neighbor and tosses his bean-bag to him, turning at once to receive the bag which is coming to him from the left. The game should move rapidly, but of course it requires skill, which may have to be acquired. With beginners it may be advisable to play the game at first with a fewer number of bean-bags. Balls may be used instead of bean-bags if desired. About every two rounds change the direction of tossing.

Bean-bag board toss. A board eighteen inches by three feet is needed. Near the lower end of it cut a square hole, a little larger than the bean-bags. Higher up in the board cut a second hole about three inches in diameter. Give the board a slant of forty-five degrees by placing one end against the wall. The player stands at a throwing line ten to twelve feet from the board. Each player may have five bags, or five may be used for the entire group, the bags being recovered for each player in turn. A bag thrown into the larger hole counts two, into the smaller hole five. The player wins who first scores fifty. Several boards may be used at once for large numbers.

Overhead bean-bag pass. The several rows of pupils compete with one another in passing the bean-bag backward over their heads. The players are all seated, with the same number in each row. On

each front desk a bean-bag is placed. At a signal the first player in each row lifts the bean-bag over his head and drops it on the desk behind him, immediately clasping his hands on his own desk. The next player catches the bag and passes it back in the same manner. It is thus passed quickly to the rear of the row. When the last player receives it, he runs forward at once to the front of the line. As soon as he reaches the front desk the entire row of players move backward one seat and the player who ran forward takes the front seat. The play thus continues until the original occupant of the front seat has again regained it. The row wins whose leader first does this.

Fox and squirrel. The players sit in their seats facing the aisles, each two adjacent rows having their feet in the same aisle. Each player thus has some one facing him across the aisle. The game consists in passing some object (the squirrel), such as a bean-bag, from one side of the aisle to the other and back again, zig-zagging down the aisle, to be followed at once by some second object (the fox), the effort being to have the fox overtake the squirrel before the end of the line is reached.

Drop the handkerchief. All the players but one stand in a circle, facing toward the center. The odd player runs around outside the circle carrying a handkerchief, which he drops behind one of the players. Those who form the circle must look toward the center and not turn their heads as the runner passes them. As soon as a player discovers that the handkerchief has been dropped behind him he picks it up and chases the one who dropped it, who may run around the outside of the circle and endeavor to reach the vacant place. The players must all run in the same direction. If the one who is chased reaches the vacant place he is safe, and the one who picked up the handkerchief must be "it."

Bird-catcher. Two opposite corners of the room are marked off, one to serve as a nest for the birds and another as a cage. A mother bird is chosen, who takes her place in the nest. Two other players take the part of bird-catchers and stand midway between the nest and the cage. The remaining players sit in their seats. All of these players should be named for birds, several players taking the name of each bird. The teacher calls the name of a bird, whereupon all the players who bear that name run from their seats toward the nest, the bird-catchers trying to catch them. Should a bird be caught by the catchers it is put into the cage, but a bird is safe if it once reaches the nest.

THIRD GRADE

Tag the wall relay. The players should all be seated, an even number in each row. At a signal the last player in each row runs forward and tags the front wall. As soon as the player is out of the aisle the others all move back one seat. The runner, having touched the wall, returns and takes the front seat. As the player sits he raises his right hand as a signal for the player who is now the last one in the row to run forward, the line moving backward one place as soon as he is out of the aisle. He, in turn, having touched the wall takes the vacant front seat. The play continues in this way until every one in the row has run. Care should be taken to have those seated keep their feet under the desks to prevent tripping. When the player who was number one in the row has run his turn and regained his seat he stands and holds up his hand.

“*Simon says.*” The players sit around a table or at their desks. Each player makes a fist of each hand with the thumbs extended. One is chosen for leader, whom the others follow. The leader says, “*Simon says, thumbs up,*” whereupon he places his own fist on the table before him with the thumbs upward and the other players must all do likewise. The leader then may say, “*Simon says thumbs down,*” whereupon he turns his own hands over so that the tips of his thumbs touch the table. He may then say, “*Simon says thumbs wiggle-waggle,*” whereupon he places his fist on the table with the thumbs up and moves them sideways. If at any time the leader omits the words “*Simon says*” and goes through the movements the other players must keep their hands still. Any player imitating him under these circumstances must pay a forfeit or become a leader, as decided on beforehand.

Weather cock. The players having learned which directions are north, south, east and west, one player, who represents the weather bureau, stands in front of the others, who are also standing, and calls out which way the wind blows. For instance, when he says, “The wind blows north,” the other players turn quickly towards the north, etc. Whenever he says, “Whirlwind,” the players all spin around quickly three times to the right. For older children half-way points may be used. Forfeits are the penalty of mistakes.

“*I say stoop.*” This game is a variation of “*Simon Says,*” but is more active than the latter. The players stand in a circle or line and in front of them stands the leader or teacher. The teacher says quickly, “*I say stoop,*” and immediately stoops himself and raises

again as in a courtesy. The players all imitate the action, but when the leader says, "I say stand," at the same time stooping himself, the players must remain standing. Any one who makes a mistake is out of the game. The leader should speak and move rapidly.

Pussy wants a corner. All the players but one are stationed in corners or at convenient goals that will serve the same purpose. The odd player goes from one to another, saying to each, "Pussy wants a corner." The player to whom this is addressed replies, "Go to my next door neighbor." All the other players watch their opportunity to change places, and do this as often as possible. Puss tries to secure a corner by rushing to any place that is vacant. Whenever she is successful the odd player becomes Puss. Puss may call "all change," when all the players must exchange places, and in the general flurry Puss should secure a corner.

Line ball. Have an even number of players in each row. Draw a line on the floor across the front of the room, a short distance in front of the blackboard. One player from each row takes his place, toeing the line. Another line is drawn at the front of each aisle even with the edge of the front desks. The game consists in tossing a ball from the leader on the forward line to those players who take their places in turn on the line at the head of the aisle. The first players in the rows rise to the right from their seats at a given signal and step to the line at the head of their aisle and catch the ball, which should be tossed to them immediately by the leader, who stands opposite. This player quickly tosses the ball back to the leader and sits down. His sitting is a signal for the player next in line to run forward and receive a toss from the leader and return the ball to him. This continues until every player in the line has caught and returned the ball. The line wins which first does this and whose leader first returns to his seat. Either bean-bags or balls may be used.

Bean-bag toss. Fasten a small box measuring not less than six inches square inside one about twice the size, and that in a third, leaving at least six inches margin between the boxes. This is set up at a slight incline. Some ten or twenty feet away from this a throwing line is drawn. Each player is provided with five bean-bags and takes his place in turn on the throwing line, throwing all five bags at each turn. A bag thrown into the small box scores fifteen, one into the middle box ten, and one into the outside box five points. The player first scoring one hundred wins.

Hopping relay race. A starting-line is drawn on the ground, be-

hind which the players stand in two or more single files facing the goal. The goal should be ten or more feet from the starting-line and may consist of a wall or a line drawn on the ground. At a signal, the first player in each line hops on one foot to the goal and hops back to the rear end of his line, which has moved forward to fill his place when he hopped out. He touches the first player in the line as he passes him and this player at once hops to the goal and back. Each player thus takes his turn. The line wins whose leading player first regains his place. In a schoolroom the players remain seated until it is their turn to hop. If the game is repeated have them use the other foot.

Follow the leader. One player, who is specially resourceful or skillful, is chosen as leader. The others all form in single file behind him and imitate anything he does. The leader aims to keep the line moving and sets hard tasks for them. He should go over and under obstacles, touch high points by jumping, etc. Any one failing to perform the task drops out of the game or pays a forfeit, as is decided beforehand.

Bean-bag ring throw. The players are divided into groups of equal numbers, which compete against one another. Rings twelve to eighteen inches in diameter are drawn on the ground or floor, one ring opposite each group of players lined up in single file. The leader of each row toes a starting line drawn across the floor ten to fifteen feet from the row of circles. Each group has six bean-bags or other objects for throwing. At a signal the leader of each row throws each of his bags in succession toward the circle and scores one point for each bag that lands within the circle. Any bag that touches the line does not count. The player then takes up his bags and runs to the rear of the line, giving the bags as he passes to the first player in the row. The players all throw in turn until the leader comes again to his original place. The row having the highest score wins. Points may be awarded for the team finishing first.

FOURTH GRADE

Blackboard relay. The class is seated, an even number in each row. The last player in each row has a piece of crayon. Each of these at a given signal runs forward and writes on the front blackboard a word suitable for beginning a sentence. Upon finishing the word he returns to his seat, handing the crayon as he does so to the player next in front of him. This second player at once runs for-

ward and writes another word bearing a suitable relation to the first one. In this way each player in the row adds to the sentence that his row is writing. The last player must complete the sentence and add punctuation marks. The points scored are: twenty-five for speed, twenty-five for spelling, twenty-five for writing, and twenty-five for grammatical construction, capitals, and punctuation. This game may be adapted to arithmetic, history, etc.

Corner spry. The players are divided into four groups, which are stationed in four corners of the room. Four captains stand in the center, each with a bean-bag, facing his corner of players, who stand in a row. Each captain throws his bean-bag to the head player in his row. The bag is thrown back to the captain, who tosses it to the next one, and so on until all the players have tossed. Then the captain calls "Corner spry" and runs to the head of the row, and the last player becomes captain. The group that first has all its players in the captain's place wins.

Bag-pile. The players are divided into two or more equal parties, which line up in ranks. Near the front end of each rank is a pile of ten to fifteen bean-bags, which are to be passed down the line. At a signal the first player in each rank takes a bag and passes it down the line, sending the others in succession after it as rapidly as possible. The last player in the line upon receiving the bean-bag lays it on the floor in front of him, and as each bag reaches him he piles it on the preceding one, thus making a stack. Only the first one may touch the floor. The stack must be able to stand without assistance and the player who stacks the bags must have no help in his task. Should the bags fall over at any time the player must pick them up and pile them over again. The line scores 1 which first succeeds in getting all its bags stacked. The last player, the one who stacked the bags, then carries them up to the front of the line and becomes the first passer for the next round of the game. The line wins which first scores five or ten, as has been decided beforehand.

Slap Jack. All the players but one stand in a circle with the odd one in the center. Those in the circle bend their elbows, which should touch their sides, and extend their hands in front with the palms downward. The object of the one in the center is to slap the hands of any player in the circle while thus extended. The circle players may bend the hands downward or sideways, but may not withdraw the arms or change the position of the elbows. Any one slapped in this way changes places with the one in the center. In

the schoolroom this is played in groups with the players seated, instead of in a circle. Two rows face each other to form a group. The one who is "it" walks up and down the aisle.

Observation. This game is a test of visual memory. A number of different objects are placed on the teacher's desk, and the pupils are permitted just one look as they pass by. They then go to their seats and make a list of the things seen. The objects should be so shielded that they can be seen only when one is at the desk. This can be applied to nature study and other work.

Bean-bag row toss. Arrange the players in rows of equal numbers. Number one in each row has a bean-bag or ball and at the word "start" stands and throws the bag or ball to number two, who also stands at the word "start." Number two throws it back to number one and sits down, while number one throws it to number three, who stands up as soon as number two is seated. Number three throws it back to number one, and the game continues until number one has received the ball back from the last player in the row. He then lays it down on the desk and runs to the seat of the last player, while all players move up toward the front seat. Number two in the row then becomes number one and tosses the ball as his predecessor did. When the first number one reaches his original place he calls "done" — thus scoring a point for his row — and starts again. The row scoring the most points in fifteen minutes wins.

Thimble ring. All players but one stand in a circle, each clasping with his left hand the right wrist of his left-hand neighbor. All right hands are thus free and all left hands occupied. The odd player stands in the center of the circle and tries to detect who holds the thimble, which is passed from hand to hand. Each player in the circle places his right hand first in the hand of the neighbor on the right and then in the hand of the neighbor on the left, with a rhythmic movement, while the entire circle repeats the lines:

"The thimble is going, I don't know where,
It is first over here, and then over there."

When the player in the center thinks he knows who has the thimble, he goes up to him and says: "My lady's lost her thimble, have you it?" If correct, these two players change places. If incorrect, the player who is "it" asks the player addressed to find it. This player has one guess. If he is correct, he takes the place of the one who has the thimble, the one who is "it" taking the vacant place in the circle, and the one who held the thimble going to the

center. Should the player be incorrect in his guess he changes places with the one in the center.

Bean-bag target toss. Draw three concentric circles on the ground or floor similar to a target. The size should depend somewhat on the skill of the players; for the youngest the inner circle should be not less than two feet in diameter and the outer six feet. For those more skilled smaller circles may be used. Ten to thirty feet from the outer line of the large circle a throwing line is drawn. When a large number are playing several targets may be used, the players being divided into as many groups as there are targets. Each group has three bean-bags and each player in turn throws all the bags at the target. Any bag stopping in the inner circle scores fifteen; in the next circle, ten; and in the outer one, five. A bag touching the line does not count.

Hound and Rabbit. A considerable number of the players stand in groups of three with their hands on each other's shoulders, each group making a small circle which represents a hollow tree. In each tree is stationed a player who takes the part of rabbit. There should be one more rabbit than the number of trees. One player is chosen for hound. The hound chases the odd rabbit, who may take refuge in any tree, always running in and out under the arms of the players forming the tree. But no two rabbits may lodge in the same tree; so as soon as a hunted rabbit enters a tree the rabbit already there must run for another shelter. Whenever the hound catches a rabbit, they change places, the hound becoming a rabbit, and the rabbit the hound. Or the hound may at any time become a rabbit by finding shelter in an empty tree, whereupon the odd rabbit who is left without shelter must take the part of the hound. The trees should be scattered so that both rabbit and hound may have many opportunities to dodge in various directions.

Poison. A circle is marked on the floor or ground, one third as large as one formed by the players clasping hands outside it. Each player tries to push or pull the others into the marked circle, but to keep out of it himself. Any one who touches the ground within the circle, if with only one foot, is said to be poisoned. As soon as this happens the player or players so poisoned become catchers. The other players cry "poison" and at once break the circle and run for safety, which consists in standing on wood. The merest chip will answer, but growing things are not counted. Any other material may be named as safety. Any one caught before reaching safety

or in changing places becomes a catcher, and when all have been caught the ring is once more surrounded.

Bull in the ring. All but one of the players stand in a circle with hands firmly clasped. The odd player stands in the center and is the "bull." The "bull" tries to break through the ring by parting the hands of any two players. If he breaks through, the two players whose hands he parted immediately give chase to him, and the one catching him becomes the bull.

Beetle. All the players but one form a circle with the odd player outside. The circle players hold their hands behind their backs ready to receive a knotted towel called the "beetle," which the odd player carries as he runs around the circle to the right. The circle players keep their eyes closed. The one with the "beetle" places it in the hands of one of the circle players, who immediately strikes his right-hand neighbor with it. The neighbor runs around outside the circle to the right and endeavors to regain his old place, the one with the "beetle" striking him as often as he has an opportunity. After the player regains the vacant place the game goes on as before, the player who received the "beetle" giving it to some one else.

Jump the shot. A bean bag or other soft article is tied to the end of a ten-foot rope. The players stand in a circle, with one in the center holding the rope. The center player swings the rope around to describe a large circle on the floor, with a sufficient length of rope to place the bag in line with the feet of those in the circle. The circle players jump to avoid being caught around the ankles by the rope. Any one caught in this way must retire from the circle, the player winning who longest retains his place.

Catch-and-pull tug-of-war. Any number of players may engage in this contest. A line is drawn down the middle of the playing-space. The players are divided into two parties and stand one party on either side of the line. The game starts on a signal and consists in catching hold of an opponent by any part of his body, as hand, arm or foot, reaching over the line and so pulling him across the boundary. Any number of players may come to his rescue and try to resist his being pulled over the line, either by pulling him in the opposite direction or by trying to secure a hold on one of the opponents. A player does not belong to the enemy until his entire body has been pulled over the line. He must then join his captors in trying to draw players over the line. The party wins which at the end of the time limit has the largest number of players.

Three deep. The players pair off in couples and all but one couple

form a circle with one partner behind his mate. Of the odd couple, one is "it" and the other is chased. The one who is chased may stop in front of any of the other couples; when he does this the rear player becomes the one chased. If the one who is "it" makes a catch, the one caught becomes "it" and tries to return the tag before the catcher can stop in front of a couple.

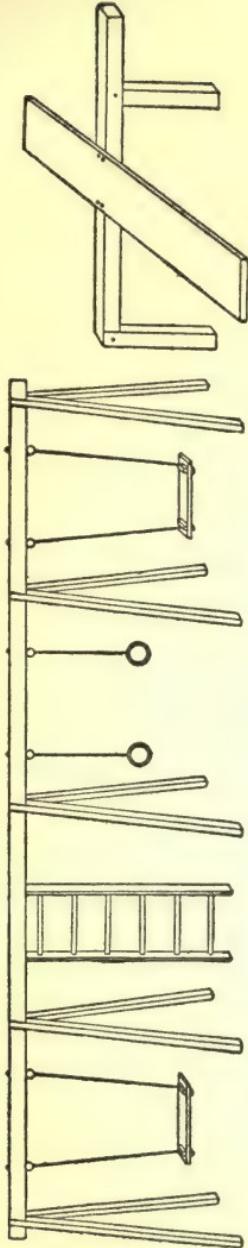
Play apparatus. There are few rural schools to-day that have any kind of play apparatus. This is something of minor importance if there is proper equipment for the games. Play apparatus, however, offers a larger variety of play opportunity and makes the playground more attractive to children.¹ Much of this apparatus may be constructed by the teacher and children as a part of the manual-training work. Such projects give an excellent opportunity for accurate measurement and the application of practical arithmetic.

On the next page, are drawings illustrating how an excellent bit of play apparatus was constructed by two progressive teachers, Mr. and Mrs. Van Sample, of the Columbia School at Delta, Colorado, at a cost of \$26.37 for material. The work was done by teachers and pupils. It is recommended that post-holes should be dug three feet deep and all corners and rough places be planed off.

These are the materials needed:

10 posts 4" X 4" X 16"	4 U-bolts of $\frac{3}{8}$ " iron
Ridge pole { 2 pieces 4" X 6" X 9' 1 piece 4" X 6" X 8'	4 bolts $\frac{3}{8}$ " X 4"
Ladder { 2 pieces 4" X 4" X 14' 12 oak strips $1\frac{1}{2}$ " X 2" X $1\frac{1}{2}$ "	8 bolts $\frac{3}{8}$ " X 4" 4 bolts $\frac{1}{2}$ " X 8" 6 eye-bolts $\frac{3}{8}$ " X 7"
Teeter-board { 4 posts 4" X 4" X 5' 2 pieces clear 4" X 4" X 5'	65 feet of chain 6 open links
Teeter-boards — 2 planks 3" X 10" X 16"	1 gallon paint
Swing seat { 1 oak board 1" X 6" X 5' 1 oak strip $1\frac{1}{2}$ " X $1\frac{1}{2}$ " X 4"	2 rings 8" in diameter

¹ The Ashland Manufacturing Company, Ashland, Ohio, manufactures an excellent bit of combination apparatus at a reasonable price. It is all steel and includes teeter, flying rings, trapeze and swing. It is called the Home Combination and would be attractive to small rural schools that can afford the cost.



Ladder rounds should
be set in as shown in
Figure 1.

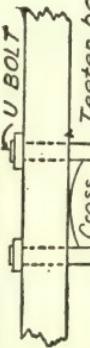
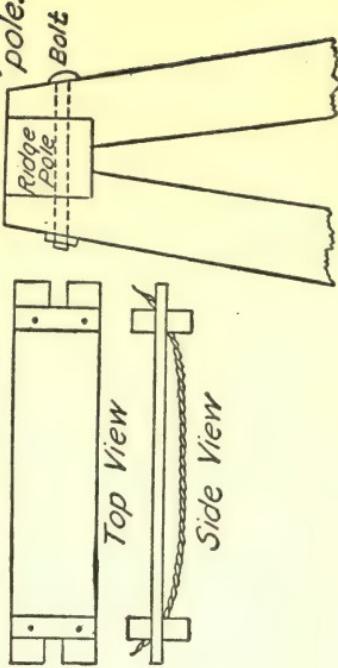


Fig. 1

Keep teeter board bearings
well greased with axle
grease.

Cross section showing
swing seat. Fig. 3
posts riveted to ridge
pole.



Top View
Side View

FIG. 28

These drawings illustrate how effective play apparatus may be constructed by wide-awake teachers and pupils.

(Reproduced from Normal Instructor and Primary Plans, June, 1918, with the permission of the publishers.)

Every school may have a *sand bin*. Such a bin might well be six by eight feet, the dimensions to vary according to the number of children. It does not require a bottom if the ground underneath is hard and level, but there should be a moulding-board or seat around the edge. If possible the white sand of the seashore should be provided, but any good building sand may do. Since the sand bin is for the little children, it should be placed in a retired part of the yard where it will be out of the way of the larger children. It should also be in the shade or the sand will get too hot in summer.

A few *swings* are desirable, but they are not a necessity and may be dispensed with entirely. They promote an individualistic kind of play which is altogether too common in the country, and they are a frequent cause of quarrels and accidents. Care should be taken to see that swings are well constructed and that they are placed in some corner of the school-grounds where there is little danger of children being struck in passing.

See-saws are open to the same objections as swings. For exercise they are, of course, inferior to the slide or the horizontal bar.

One of the most popular pieces of apparatus is a *slide*, which is almost always in use. Children are apt to quarrel over the swings, but they naturally take their places at the slide so there is no hard feeling. Sliding represents a natural interest of children, for they are forever sliding down banisters and cellar doors. It requires considerable pains and careful work to make a slide; so it is better to secure one from some good supply house. Many manufacturers of play apparatus make a metal slide, but these are not to be recommended, as they are apt to rust and ruin clothes; in winter they are too cold and in summer too hot. They are also usually too expensive for rural schools. An excellent wooden



LUNCH-HOUR IN A RURAL SCHOOL IN OHIO

(Courtesy of Miss Kauffman, Ohio State University.)



A SLIDE IS THE DELIGHT OF EVERY PLAYGROUND

(Photograph by the author.)



A RURAL SCHOOLHOUSE IN MICHIGAN, TYPICAL OF THE 212,000 ONE-ROOM RURAL SCHOOL BUILDINGS IN THE UNITED STATES

Over one half the American children attend the rural schools which are as yet practically uninfluenced by the oncoming movement in health education.

(Photograph by the author.)



DEMONSTRATION RURAL SCHOOL OF THE FIRST DISTRICT NORMAL SCHOOL, KIRKSVILLE, MISSOURI

A model one-room school in which country children are as well housed as children in our best city schools. (See Floor Plans, on pp. 24, 25.)

slide may be secured at a reasonable price from the Hill-Standard Manufacturing Company, Anderson, Indiana. (See illustration opposite p. 220.)

Every school yard should have a *horizontal bar*. This is needed for the chinning contests for athletic badges. The ground beneath should be excavated and filled in with sand to prevent accidents and to encourage the use of the bar. Three bars placed respectively about five and a half feet, six feet, and six and a half feet from the ground are recommended. Curtis suggests that "a gas-pipe or a fork-handle run through two augur-holes in upright posts will do, if nothing better can be obtained."

Running and jumping are favorite pastimes among all children. On city playgrounds regular *running-tracks* of cinders are being made, but this is quite unnecessary in the country, where a dirt track is about as good. If the track is stripped of sod, dragged, and rolled, it will be smooth and springy. If space permits, a track should be made by all means, even if it is not more than sixty or seventy feet long and five or six feet wide. A *jumping-pit* should be made at the end of the track. This is made by excavating the earth for about fifteen feet and filling in with sand or sawdust. As the children usually enjoy the high jump more than the standing jump, a pair of jumping standards should be made or purchased. All that is needed is some kind of substantial base with uprights, marked with feet and inches, and a series of holes through which a bar or a string may be inserted.

How and where play apparatus may be secured. Any teacher in an ordinary-sized rural school may obtain all the equipment for plays and games that is necessary if she is patient and secures the coöperation of the pupils and community. Much of the apparatus can be made by the children, as has been pointed out. Making apparatus is edu-

cative not only because the children use practical arithmetic and learn to handle tools, but also because they learn to be helpful socially.¹ Even if there is enough space for a good deal of apparatus, it would not be wise to get it all at once, as securing one piece at a time will be far more interesting to the children. Money to buy equipment may be secured frequently by school entertainments. Apparatus purchased from a reliable firm has the advantage, of course, of being stable and durable. Beautifully illustrated catalogues of play equipment may be secured from the following reliable firms:

The Ashland Manufacturing Company, Ashland, Ohio.

The Hill-Standard Manufacturing Company, Anderson, Indiana.

The American Playground Device Company, Anderson, Indiana.

Athletic badges for boys. The physical development of boys may be greatly stimulated by conferring some distinctive honor upon those who attain certain degrees of excellence in athletics. The Playground and Recreation Association of America has suggested the following standards which every boy ought to be able to attain:

First test

Pull-up (chinning).....	4 times
Standard broad jump.....	5 feet 9 inches
60-yards dash.....	8½ seconds

Second Test

Pull-up (chinning).....	6 times
Standing broad jump	6 feet 6 inches
60-yards dash.....	8 seconds
100-yards dash.....	14 seconds

¹ Teachers will find some good suggestions in Dr. Arnold's *Some Inexpensive Playground Apparatus*, a pamphlet which may be secured by writing to the Playground Association of America, 1 Madison Avenue, New York City. See also Henry S. Curtis. *The Reorganized School Playground*. United States Bureau of Education, Bulletin No. 14.

Third test

Pull-up (chinning).....	9 times
Running high jump.....	4 feet 4 inches
220-yards run.....	28 seconds

The following rules govern all final competitions:

No boy is permitted to receive more than one badge in one year. It is necessary to qualify in all three events in any one class in order to win a badge.

There shall be but one trial in chinning, one in the dashes, and three in the jumps.

Boys who are able to pass these tests and are properly certified by their teachers may secure a badge from the Playground and Recreation Association of America. These badges are made of bronze and are of simple and beautiful design. It is recommended by the Association that every boy pay for his own badge. The price for each badge is twenty cents.

The Association suggests that when these badges are presented there be some kind of public occasion so that the boys who receive them may have their sense of loyalty to country deepened, and also to impress the other members of the community who witness the ceremony. In most rural schools there would probably be so few candidates for honors that a special kind of occasion would scarcely be appropriate, but they might be conferred at the last day of school or at some other public entertainment.

Boys who receive the badges are asked to repeat the following declaration of allegiance to America:

I will honor my country.

I will do my best to build up my country's free institutions.

I will not disgrace my city or my school.

I will try to keep myself strong for my country's service.

Every teacher should send five cents to the Playground and Recreation Association of America, 1 Madison Avenue,

New York City, for a copy of the pamphlet *Athletic Badge Test for Boys*.

Athletic badges for girls. Girls in the country are, as has been noted, probably in greater need of physical development than boys. The athletic badge contests for girls, then, is even more important for them than for the boys. The Playground and Recreation Association of America has adopted these standards which every normal girl ought to attain:

First test

All-up Indian-club race.....	30 seconds
or potato race.....	42 seconds
Basket-ball goal throwing.....	2 goals, 6 trials
Balancing.....	24 feet, 2 trials

Second test

All-up Indian-club race.....	28 seconds
or potato race	39 seconds
Basket-ball goal throwing.....	3 goals, 6 trials
Balancing (bean-bag or book on head)....	24 feet, 2 trials

Third test

Running and catching.....	20 seconds
Throwing for distance, basket-ball.....	42 feet,
or volley-ball.....	44 feet

Volley-ball serving..... 3 in 5 trials

What has been said in a general way about the contests for boys applies also to girls. The Playground and Recreation Association of America, 1 Madison Avenue, New York City, also publishes a pamphlet entitled *Athletic Badge Tests for Girls*, which may be secured for five cents.¹

The organizing of these contests in rural schools will do much to inspire an interest in healthy sports. It will also attract the attention of the community.

Getting the community to play. One way to make play

¹ This Association also publishes many other valuable pamphlets on play. Some of these are free, while others may be obtained at nominal prices.

popular among children and the people of a community is to set aside some special day or afternoon for play, and invite the people of the neighborhood to be present, and perhaps take part.

Rural schools are beginning to have play festivals where there is an exhibition of playground activities such as folk-dancing, singing, drills, and games. This requires careful preparation by the teacher. A program must be made out and rehearsed several times.

The following is a program exactly as given at a rural school:¹

SPRING FESTIVAL

June 2, 1916

1. Processional — Crowning of the Goddess of Flowers, or the May Queen
2. "Queen of the May-time".....*Sung by All Grades*
3. Dance of Greeting — "O, A-Hunting We Will Go".....*First Grade*
4. "Pop Goes the Weasel" — Merry-go-round.....*Second Grade*
5. "Oats and Beans" — Mountain March Song,
 "Dancing Song".....*Third Grade*
6. "Ace of Diamonds"
7. "Brownie Polka," "How Do You Do".....*Fifth Grade*
8. "Morris Dance"
9. Song, "May-time" — Ribbon Play.....*Eighth Grade*
10. May-Pole Dance.....*Seventh Grade*

Sometimes one day is devoted to a *field day* where the boys and girls may take the various tests for athletic badges. There might also be jumping, racing, and matched games. Such a program should not be confined entirely to the children of the school. The older boys and girls who have left school and the men and women of the neighborhood should also be invited to participate in events arranged especially for them. On such an occasion there might also be an *inter-school contest* in which two or more schools might compete. The inter-school contest is especially desirable in the country

¹ Wilkinson, *Rural School Management*, p. 159.

because so much of the country amusement is individualistic. Country boys and girls need to learn to coöperate, as do also rural communities.

If a field day is arranged, the people of the community should be invited to come and bring their dinners. Here is a chance for everybody to get together and have an enjoyable time, to get the real spirit of play. If such occasions are handled successfully, the teacher will find a spirit of helpfulness on the part of school board and community that will make it comparatively easy to get appropriations or to raise money for play apparatus or other necessary school equipment.

Every school needs an American flag. As a means of teaching patriotism, and also of imparting a pleasant and inspiring flavor to all school activities, such as field days, athletic events, holidays, etc., every school should possess a good-sized American flag. This may float above the school-house or from a flagstaff. If there is a large playground it may be especially desirable to have a flagstaff. In rural communities where there is timber and in a school where there are older boys, it will ordinarily be easy for the teacher to get patrons of the school to furnish the timber and with the help of the boys to prepare and install the pole. Excellent removable galvanized steel flagpoles of varying lengths may be purchased at a reasonable price from the Newark Steel Post Company, Newark, New Jersey.

The flag-raising may easily be made an event of unusual importance to bring the community together. The children may speak patriotic pieces, stirring songs may be sung, and games involving both children and parents may be played.

Goal of school, permanent interest in healthful physical activity. Pupils in their work in physiology and hygiene should get some understanding of why play and vigorous physical activity are healthful, but if the influence of the

school ends there, the time spent will be almost valueless. Boys and girls must in some way get such a love for wholesome, out-of-door games, sports, and diversions that these interests will abide throughout life. One of the astonishing things about most country people is their lack of enjoyment of the out-of-doors. Only a few of the many species of birds or varieties of flowers that are found in profusion in country lanes and woods are known by them. They do not recognize and love the commonest things in the world of nature. Besides introducing many new games and new play equipment to the children, the teacher has a chance to open up interests which will tend to make children take long walks into the woods and fields to observe the wonders all about them. Lessons in geography, general science, nature-study, and even hygiene may be studied better on walks and excursions. If we wish to arouse a permanent interest in such healthful physical activity as walking, we must get children interested in the great out-of-door world so that they will visit it voluntarily.

CLASS EXERCISES

1. How would you meet the objection that children do not need to play at school because they have enough exercise at home after school and on Saturday?
2. It is believed by many authorities that children in the country do not know how to play many games, and those which they do play are not always best for their physical development. Visit a rural school and ask the teacher to get the children to write a composition telling about the games that they play and the ones they play most. What percentage of these games would help to arouse a spirit of coöperation? What percentage is distinctly valuable for the physical development of country children? What important games are seldom if ever played?
3. Write to some manufacturers of play apparatus (see page 222) for catalogues. Select the play apparatus necessary to equip the yard of some particular rural school. Estimate the cost. If you could buy only one piece of apparatus, what would it be?
4. Let every member of the class report on the play activities in schools

visited. How many have play apparatus? In what condition did you find apparatus? Were the children being taught new games? What were they? How much time, if any, was being devoted to physical exercise indoors? To what extent were the teachers realizing their opportunities in promoting wholesome physical activities?

5. Examine some good books on folk-songs and dances (see page 202) and select some half-dozen songs and dances which you would teach children in rural schools.
6. What arguments would you advance to support the proposition that the rural school ought to be a center for social recreation?
7. Should the play spirit be introduced into the regular school work? Why?
8. Draw up plans and specifications for play apparatus which children might make.
9. Collect statistics showing the benefits derived from playgrounds in cities. Would you expect these same advantages to result from the introduction of playgrounds into the rural schools? Explain.
10. What are you doing for daily recreation in the open air. Are you spending enough time? Consult H. S. Courtis's *Recreation for Teachers* (The Macmillan Company, New York, 1918) for suggestions on recreation.

CHAPTER XII

POSTURE AND HEALTH

Only in the perfectly erect position of the body are the great organs of the trunk — heart, lungs, stomach, liver, kidneys, and other viscera that constitute the main working machinery of the body — in a position to perform their work to the best advantage.

(*Jessie H. Bancroft.*)

The seriousness of bad posture. Bad posture is too often regarded as a harmless habit. If any effort is made to correct this tendency at home or even in the school, it is frequently not because health seems so directly concerned, but because it detracts from one's personal appearance. This latter view is, of course, correct, and needs to be considered as one of the reasons why children should be educated in proper posture; but this reason, important as it may seem, is of minor importance; for bad posture is one of the worst foes of health and efficiency.

In the preceding chapter, it was pointed out that health and vigor depend on the exercise of the vital organs of the body. Anything that interferes with the normal functioning of respiration, circulation, and digestion is a menace to health. The boy or girl with stooped shoulders (this is the most common defect) and a tendency to become more round-shouldered as time goes on has formidable obstacles to happiness and success.

The effect of posture upon respiration is easily demonstrated. When there is faulty posture there is a lessening of the respiratory movements and also of the intake of air. This is especially noticeable in lateral asymmetry (a condition in which one shoulder is carried higher than the other). The ribs are then crowded close together between a low shoulder and a low hip on one side while they are propor-

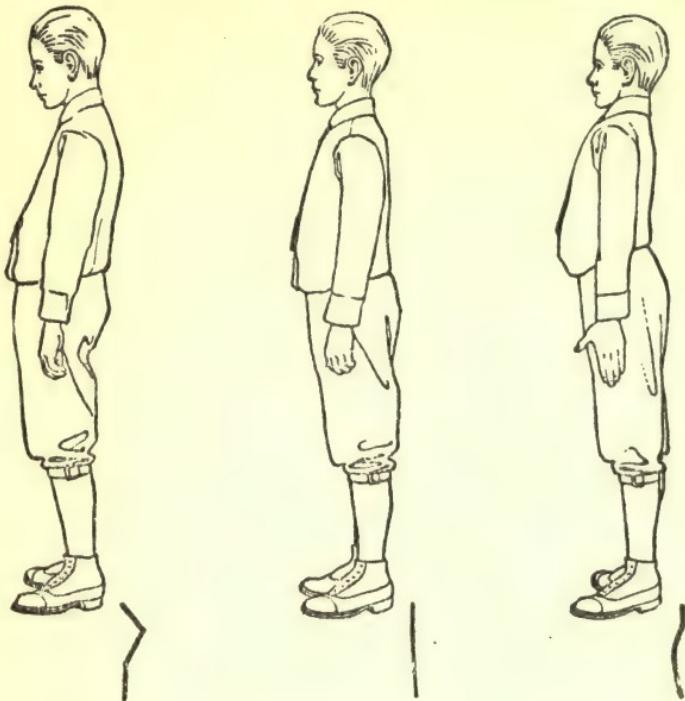
tionately separated between a high shoulder and a high hip on the other side. This wide separation of the ribs on the side of the high shoulder interferes with their activity and with the entrance of the tidal air, particularly at the apex of the lung on that side. The inactivity of this part of the lung leads to a general weakness of the tissue which makes the invasion of disease easy. It is at this point, according to reputable physicians, that tuberculosis begins its work. There is abundant evidence to prove that bad posture invites tuberculosis.

The influence of bad posture upon the organs of digestion is almost as vicious. Habits that produce round shoulders and forward drooping of the head also lessen the amount of space necessary for the functioning of the organs of the abdominal cavity and lead to their displacement. This displacement is especially favored in the case of those who are of tall and slender build. The folds and turns in the digestive tube are deepened by constant pressure. The canal being partially closed in places, the natural onward movement of its contents is obstructed. This gives a chance for bacteria to collect and multiply, and much of the poison, instead of being thrown off by the bowels, is carried into the general tissues of the body. "As a result," says Dr. Mosher,¹ "constipation, diarrhoea, flatulence, disturbances of circulation, headaches, nervous irritability, and, most marked of all, *fatigue out of proportion to effort expended*, lessen the efficiency of the individual and often make life a burden."

According to Bancroft, "erect carriage of the body is necessary (1) for full vigor and health; (2) to prevent waste of energy in maintaining the upright position in any of the activities of life; and (3) with children to admit of proper growth and development."

¹ Eliza M. Mosher. *The Relation of Posture to Health*, *Proceedings, American School Hygiene Association*, vol. VI, p. 98.

Reference has already been made to the prevalence of bad posture among country children. Enough has been said about the evil effects of bad posture to indicate that posture is one of the important problems of every teacher in rural



Incorrect posture (weak or fatigue posture). The neck and trunk form a zigzag line.

Correct posture (strong, healthful, beautiful, and efficient). The neck and trunk form a straight, vertical line.

Exaggerated posture (ridiculous, ugly, and incorrect). This posture can be held only for a short time with great effort.

FIG. 29. DRAWINGS ILLUSTRATING POSTURE
(From Wall Chart issued by the American Posture League, Inc.)

schools. Not until the teacher realizes that it is just as important for children to be educated in proper posture as it is for them to read are definite results likely to be attained.

Correct posture defined. The American Posture League, an association formed to further good habits of posture, defines the correct standing position as one in which the

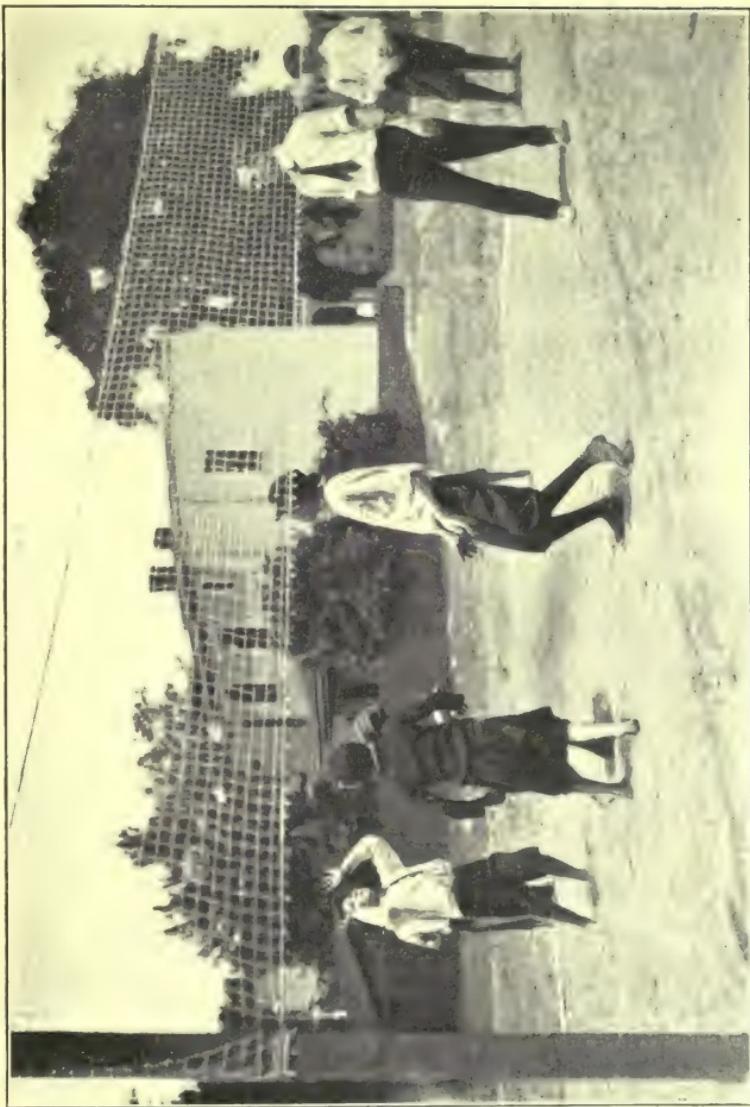
long axis of the trunk of the body, including the neck and head, is in a vertical line. In poor posture the neck, head, and trunk, instead of being in one continuous vertical line, are broken into three zigzag lines. (See Fig. 29.)

The correct posture may be estimated by what is known as the vertical-line test. A line is dropped from the front of the ear to the forward part of the foot. This will show whether the vertical line parallels the main segments of the body (neck, head, and trunk). Instead of using a line it may be more convenient to use a window-pole. (See illustration opposite p. 233.)

Sitting positions are to be judged in much the same way. When in correct position the axes of trunk, neck, and head should be in continuous line. The same relation of parts should be maintained whether the child is leaning backward in repose or forward in study. The chest should be kept broad and open, and as the child leans forward the bend should come at the hip joints and never from the waist.

The teacher's problem. Those who are familiar with the physical condition of school-children say that there is an army of round-shouldered boys and girls in our schools. Their condition is a reproach to boasted systems of education. How is the teacher to face this practical problem? First of all, something must be done to eliminate those conditions making for such defects. Second, an effort should be made to correct bad posture.

Lack of proper exercise cause of bad posture. To grapple with the problem of incorrect posture, the teacher needs to understand, first of all, that this defect is due to the improper balance in the play of antagonistic muscles. As is well known every muscle has its antagonist. For every muscle which pulls in one direction there is another which pulls in the exact opposite. There is one set of muscles to



A LIVE GAME OF VOLLEY-BALL

Volley-ball is an excellent game to cultivate good posture. Notice the head and shoulders of the boy who is about to catch the ball. (Courtesy of the Playground and Recreation Association of America.)



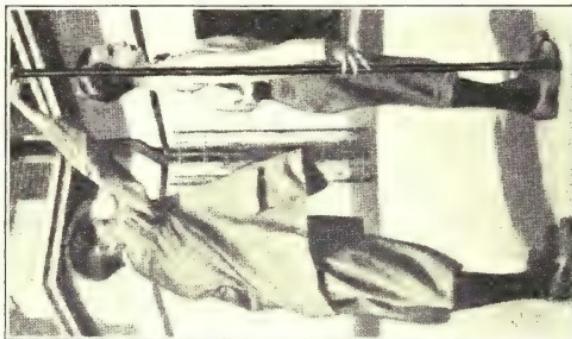
UPWARD STRETCHING
THAT TENDS TO CULTI-
VATE GOOD POSTURE
(Photograph by Lulu
Donovan.)



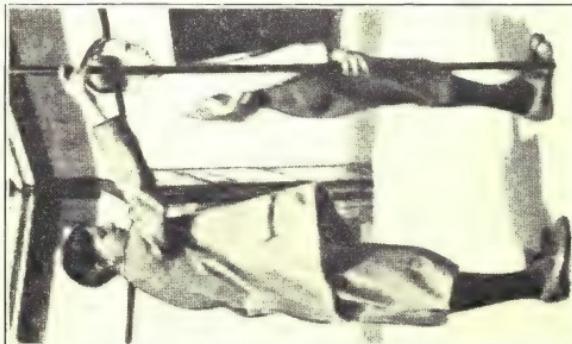
HEAD EXERCISE FOR
CORRECTING A FOR-
WARD DROOP OF THE
NECK



STARTING POSITION
FOR THE SHOULDER
BLADE EXERCISE
(Photographs by the
author.)



TESTING POSTURE WITH A WINDOW POLE
(From Bancroft's *The Posture of the School Child*. With the permission of
The Macmillan Company.)



pull the arm up and still another set to pull it down. The contraction of the great pectoral or breast muscle draws the shoulder forward and nearer the breast-bone, while the contraction of the muscles of the back pulls it in just the other direction or backwards and nearer the backbone. The deficient use of the back muscles, with or without an excessive use of the breast muscles, will in time lead to a permanent condition in which there will be an abnormal elongation of the back muscles and a corresponding shortening of the breast muscles. Unfortunately most of the activities of life involve greater use of the breast muscles than of the back muscles. The farmer chopping wood, the woman washing dishes, and the boy or girl studying at a school desk are using the breast muscles rather than the back muscles. During the plastic period of childhood and youth the over-use of the breast muscles will finally lead to habits which cannot be readily overcome. It is during these periods that bad posture can best be prevented and corrected. Both prevention and correction depend on the proper use of the muscles which operate at the shoulder. When there is a special defect to be overcome, special exercises will usually be necessary to contract the upper back muscles.

Overcoming the mental indifference of pupils. The muscles involved in acquiring and maintaining correct posture are under the control of the will; therefore, unless there is a proper attitude of mind toward the question of posture one may fall into bad habits, or, being already in bad habits, there is less likelihood of their being corrected. Unless the teacher is able to enlist the coöperation of the pupil so that he has a keen desire to acquire correct posture, the probability of success is slight. Teachers find that the vast majority of their pupils are quite indifferent to their posture. This is found not only in our rural schools, but also in high schools and even in colleges and universities. One

reason for this indifference is ignorance of the consequences of bad posture. Even little children can understand that if they stoop, the lungs have less room for their work. The health motive should be appealed to as strongly as possible, but children are even more apt to respond to the desire to have a good appearance and command the admiration of



FIG. 30. EFFECTS IN APPEARANCE FROM THE SIMPLE ACT OF LIFTING THE CHEST

The habit of frequently lifting the chest is often the means of molding the body into normal shape.

(From Walter's *Principles of Health Control*, with the permission of D. C. Heath & Co.)

the teacher and other pupils. Most pupils do not realize how badly they are deformed through bad posture, and what a difference is made in their appearance by the simple act of lifting the chest. (See Fig. 30.) If the teacher has in mind the standard of correct posture adopted by the American Posture League, she will be able to collect many pictures from magazines and books showing both correct and incorrect posture. At this writing when there is such a uni-

versal interest in military affairs, it will not be difficult to get some good illustrations of soldiers with excellent carriage. Put these pictures on the bulletin board and ask the children to point out those individuals of finest appearance and also to tell you why. Children may also be encouraged to collect these pictures. The most difficult step is, of course, to get the children to become that which they have learned to admire. The right mental attitude is not sufficient. The children must be trained.

Educating the consciousness of correct posture. We

know what our bodily posture is at any one time because of sensations which we receive from sense organs located in our muscles, tendons, and joints. The person who habitually carries his shoulders in the right position, if he happens by chance to take a wrong posture, is warned by the unusual sensations from his muscles that something is wrong; he feels uncomfortable and at once assumes the correct position. Children who have never carried their shoulders back know nothing about the correct posture because they receive no sensations of correct posture. They are as ignorant of these sensations as is a man blind from birth of the beauties of the landscape or the colors of the spectrum. Seeing pictures of good posture may be helpful in inspiring the right attitude of mind, but unless pupils receive the sensations which accompany good posture, they will not know whether they have attained the correct bodily position or not.

Training in posture. Teachers who have seriously attempted to correct bad posture have resorted to nagging, the worst possible method; for, as Bancroft says, "Nothing could be more unjust or even cruel to a child than to expect him to correct, solely by spasmodic effort of his will, faults incidental to the shape, weaknesses, and development of his body in the process of growth. Systematic training, especially designed to cultivate the right contours, to strengthen weak muscles, and to establish correct neuromuscular habits, is the only effective way of reinforcing and training the will power that he must exert to establish the right habits."

If the child is really to know what correct posture is, he must get into the proper bodily position as soon as possible. Many children will be able to take this position by simply following a few simple directions. But those children who lack power and control must literally be placed in proper

position by the teacher. To get the first-mentioned class of children into position Bancroft recommends that children be instructed to stand with arms stretched "directly side-wise at shoulder level with the palms turned downward, and, holding the arms there, sway forward from the ankles so that the weight of the body is nearly or quite over the balls of the feet, not, however, rising on the toes, but keeping the heels on the ground." An effort to draw the neck backward (chin inward) which may be necessary to bring the neck into an upright position, and also to draw in at the waist line, will improve the standing position. Keeping head, chest, and shoulders just in these positions, the arms should then be dropped to the sides. This will leave the body in a correct standing position.

If the child cannot of his own accord get the correct position, the teacher must see that he is placed in position. The point of difficulty is invariably the upper part of the trunk. The problem is to get this part forward without getting an exaggerated position. Special attention should be given to children of this type until the weak muscles have been strengthened. Playing volley-ball, using the parallel bars, and other outdoor games and sports suggested in chapter XI will help prevent and correct defects.¹

Not only should children have drills in standing, but also in sitting. The sitting drill should be taken every day. There should be practice in the three ways of sitting—erect, leaning forward from the hips, and leaning backward.

The coöperation of the home. In every school the teacher

¹ Every teacher who is ambitious really to do some corrective work in posture should have access to Bancroft's *The Posture of School-Children*. It is a thorough-going discussion of the whole matter and has many exercises especially adapted to the correction of posture. Classroom exercises especially suitable for corrective work may be found in the inexpensive volume (paper-bound edition), Keene's *Manual of Physical Training, Games, and Mass Competition*, World Book Company, Yonkers, New York.

will find pupils who need special exercises at home to strengthen weak back muscles. Most parents, if the matter is well presented, would be glad to lend their active support to see that the required exercises are practiced. This coöperation may be brought about by talking over the problem with the parents when the teacher calls at their homes, or by bringing up the whole question of posture at some meeting of the parent-teacher association. When there is a marked deformity parents should be encouraged to consult a physician.

The kind of exercises that are required will depend, of course, on the nature of the muscular weakness. Every teacher should have some reliable book on gymnastics and physical exercise for reference. Chapter XIV in Bancroft's *The Posture of School-Children* is especially valuable on home exercises for the correction of poor posture. It is impossible to consider the problem of home exercises in detail. Reference will be made to two or three exercises which tend to correct some of the most common defects.

Home exercises. As has been observed before, a common defect among country children is round-shoulderedness. Something needs to be done to correct the position of the shoulder blades. For this Bancroft recommends the following exercise:

Swing the arms forward to shoulder level and bend the elbows so as to bring the finger tips to the top of the shoulders, with the elbows pointing forward. This is the starting position (see illustration opposite p. 233), and the fingers remain on the shoulders throughout this particular exercise. From this position, lift the elbows and describe with them a semi-circle at the sides, upwards backward, and downward. This closing position should leave the upper arms close at the sides and should contract the muscles that draw the shoulder blades close together; that is, inward toward the spine and flat upon the back.

Take the movement deliberately, then swing the elbows directly

to the front again, the finger tips remaining on the shoulders, and repeat the upward, backward, and downward motion of the elbows, describing with them a semicircle in one continuous movement.

The incorrect position of the shoulder blades is usually associated with a forward slope of the neck. This is to be remedied by strengthening the muscles on the back of the neck and shoulders that hold the upper part of the spine erect. Bancroft recommends the following exercise:

Still holding the correct standing position as a foundation, and placing the hands on the hips, with thumbs backward and elbows pointing straight to the sides, relax the head and drop it backward. (See illustration opposite p. 233.) This is the preliminary movement and is one of relaxation, having no effort in it. From this position lift the head upward and draw the chin strongly inward, as though making a double chin. The effect is to straighten the forward slope of the neck, as with a checkrein, so that its column is upright instead of inclining forward. Relax the muscles again, letting the head drop backward, and repeat the strong upward pull.

This exercise like the previous one should be repeated from four to ten times in succession.

A triple test for posture. In the schools of New York City, under the direction of Bancroft, children are tested on posture once a month. First, pupils are asked to stand. The teacher notices the figure of each pupil as a whole to see whether it is straight or zigzag. This would, of course, be an inadequate test if taken alone, because some pupils are able to maintain a proper standing position for a short time, but soon lose it when the mind is diverted to other things. Only those passing the test will remain standing. The second part of the examination is the marching test. Children are put through marching exercises for four or five minutes. An effort is made to distract the attention from posture by drills, marking time, etc. As this goes on, the teacher will notice that some of the old habits of bad posture, such as letting

head drop and chest sink, will reassert themselves. As the faults occur the pupils will drop out of line. In the third part of the test those who have been successful in the other two will be put through the exercise test, which is intended to show the strength and coördination of those muscles that are weak in poor posture, especially those that hold the spine erect. Many of the exercises found in any practical book of gymnastics would suffice. Those pupils who again show weaknesses should be dropped from the group.

There seems to be no good reason why any teacher in rural schools should not be able to give these tests if she studies the matter carefully, and particularly if she has the aid of Bancroft's *The Posture of the School-Child*. Macmillan Co., N. Y.

Marks and promotion in posture. Following the New York plan, the teacher may designate those who have passed the triple test Division 1, and those who failed, Division 2. Membership in Division 1 should mean that those pupils have a passing mark. Every child should keep a record of his own rating each month, and the teacher should have a complete record for the class. Class percentages may be kept by finding the proportion of those taking the test who passed. For example, if three pupils out of twelve tested passed, the class rating would be twenty-five per cent. These class percentages for each month should be posted on the bulletin board so that the pupils may know exactly what progress, if any, is being made.¹

Such a plan speedily fires the rivalry and ambition of the pupils. Everybody is naturally anxious to get into the favored section. Teachers may foster this spirit in many ways by giving badges to those who pass in posture or grant-

¹ While it is not to be expected that children will always be in correct positions, yet their *habitual* positions should be correct. No pupil should finally be passed in hygiene, really admitted to membership in Division 1, until he has an habitually correct sitting posture.

ing them special privileges. With a real desire to improve in posture, boys and girls may be depended upon to take a greater interest in gymnastic exercises, home exercises, and habitually correct positions. Since the tests lead the teacher to focus her attention on the defects of those who are weak in posture, she may give them special attention. Teachers who have tried these methods report much enthusiasm and tangible progress on the part of their pupils.

Good posture pins. To stimulate an interest in good posture the American Posture League has issued a pin for good posture. The design shows an American Indian in profile on a small oval. The pin is made in bronze and silver for two grades of award, the conditions of which are as follows:

The posture is to be judged according to (a) the vertical line test illustrated on the League's wall charts,¹ which posture is to be held (b) during the triple test for endurance in posture.

The triple test consists of judging the posture in (1) standing, (2) marching for at least three minutes, (3) corrective exercises, including stretching the arms forward and upward. A candidate must hold good posture throughout all three parts of this test taken in rapid succession to be considered as passing the triple test.

Bronze pin. A candidate to be eligible for a bronze pin must pass the triple test for posture once a month for three consecutive months.

Silver pin. A candidate to be eligible for a silver pin must:

- (1) Pass the triple test for posture once a month for six consecutive months and have a rating of A for habitual good posture, or
- (2) Have previously won the bronze pin, pass the triple test for four additional consecutive months and have a rating of A for habitual good posture.

Bronze pins are 20 cents each and silver pins 25 cents each.

Teachers who have a list of candidates who have passed the test should send to the American Posture League, Inc.,

¹ See p. 231.

1 Madison Avenue, New York City, the order for pins and a certificate which the League will furnish on application.

As in the case of the athletic badges to which we have referred, it would be desirable to present these pins to the boys and girls on some public occasion so that it might stimulate other pupils to win like honors and also to impress the community with its importance.

The prevention of incorrect posture. The prevention of improper posture is even more fundamental than its correction, although we have considered the latter problem first. There is necessarily some overlapping of the two points of view in actual practice, as the elimination of many of the causes of incorrect posture will not only prevent, but help to correct as well. Some of the contributing causes of bad posture are (1) improper schoolroom equipment and sanitation; (2) undesirable habits of the children; and (3) ill-health. Let us consider each of these in turn.

Schoolroom seats. A visit to any rural school will soon convince the intelligent visitor that the child is usually adapted to the seat rather than the seat to the child. Children sitting in seats that are too large or too small, or are otherwise misfits, are easy to find. Sometimes this is due to non-adjustable seats, but it is not infrequently found in schoolrooms where the furniture is adjustable, but has not been adjusted.

The chief criticism of our school seating is that, either because of the seat itself or because of lack of adjustment, the pupil is forced into a position that fosters spinal curvature and a cramped chest. Some of the common defects in school seating, according to Dr. D. F. Lincoln,¹ are as follows:

First, the desk may be too high for the child's sitting height, causing an excessive elevation of the shoulder of the hand which

¹ From Barry's *The Hygiene of the Schoolroom*, pp. 41, 42.

the child will write with, usually the right. In attempting to get the elbow on the high desk, the shoulder is elevated, the corresponding one lowered, and the spinal column tilted.

Second, the desk may be too low, causing the child to stoop forward. This causes the neck to flex upon the body, producing interference of circulation from the head, congestion resulting, which interferes with the eyes. This same fault causes round shoulders from the continued stooping to be sufficiently near the work.

Third, desk too far from seat, with stoop of the body, injuring the eyes. Danger here is in injuring the health by compression of the abdomen and chest, dyspepsia, small chests and round shoulders.

Fourth, flat desk lid, interfering with freedom of writing, disadvantageous as respects receiving the light and compelling the child to hold up his book in order to see.

Fifth, seats too high, so that the feet are not supported and the legs grow weary.

Sixth, insufficient support for the back, causing fatigue and improper attitudes and consequent tendency for the spine to yield and take a side curve.

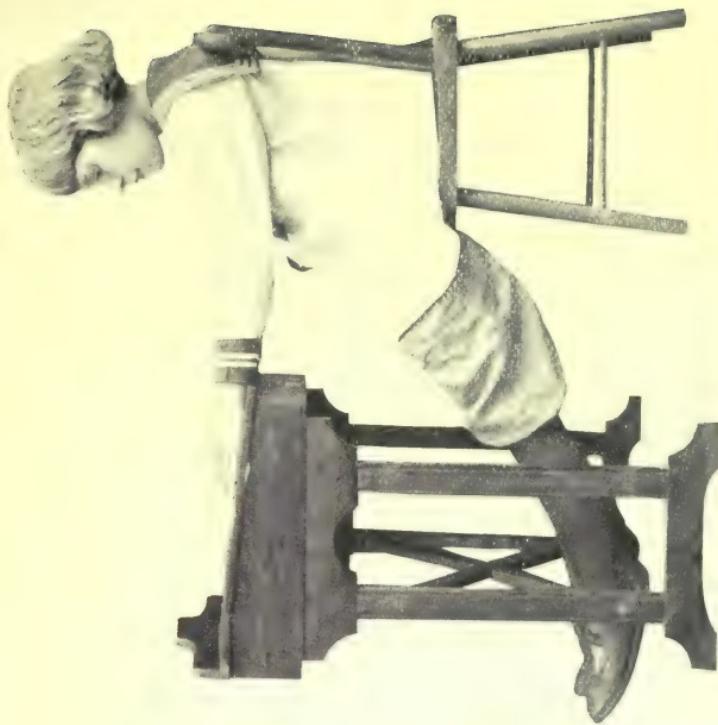
Seventh, seat not hollowed suitably, causing pain and restlessness.¹

Eighth, a well-proportioned desk and seat, but not adapted to size of the child using it.

If a child is properly seated he should be able to rest his feet comfortably on the floor without pressing upon the nerves and blood-vessels under the knee, the seat should be so shaped as to encourage the sitter to sit with pelvis well back in the chair, the small of the back should be well supported, the distance of the chair from the desk, its height and slant, should be such that bending forward will not be encouraged.

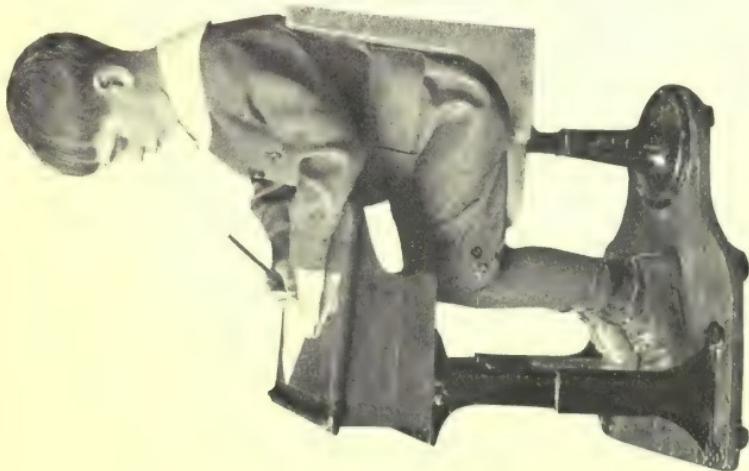
The American Posture League, after a number of thorough-going and scientific investigations and experiments,

¹ Such a seat also leads the child to slide down in his chair bringing pressure on both ends of the spinal column. (*Author.*) See illustration opposite this page.

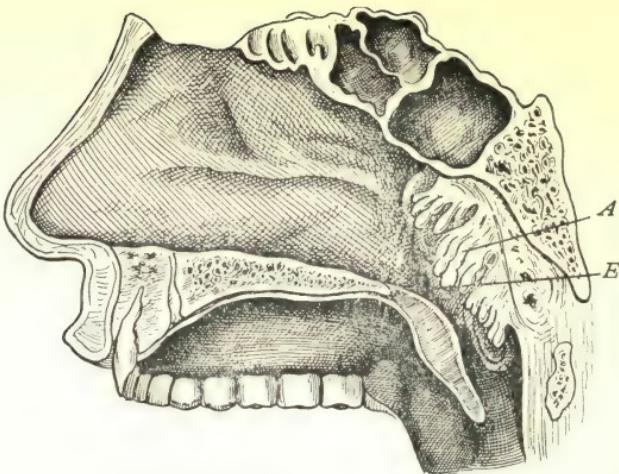


A COMMON EXAMPLE OF BAD POSTURE OFTEN DUE TO FATIGUE
OR BADLY ADJUSTED FURNITURE

(Photograph by the author.)



CORRECT SITTING POSITION
Desk and seat are properly adjusted.
(Courtesy of the publishers.)



ADENOID GROWTH AND ITS EFFECTS

E shows about the level of the eustachian tube connecting the throat with the ear. The adenoid growth (*A*) blocks up, or causes mucus and swelling to block, the eustachian tube and induces deafness among other troubles.

(From Winslow's *The Prevention of Disease*. Courtesy of W. B. Saunders Company.)



BEFORE AND AFTER REMOVAL OF ADENOIDS

(From Terman's *The Hygiene of the School Child*. With the permission of Houghton Mifflin Company.)

has designed a school seat which is now on the market. It is without doubt the most hygienic seat available.

Any of the adjustable seats on the market are quite satisfactory *if they are kept adjusted.*

What the teacher may do. The teachers or prospective teachers who read this book are not apt to find in every case the most hygienic school furniture in their schoolrooms, but it is possible to do something to make the school seat in use more adaptable to the children. One of the things which every teacher might hope to do, if she stays long enough in any particular school, is to get the school officials to put in modern seats if they are lacking. But until that day arrives she should do what she can in the interest of the health of her pupils. If none of the school furniture is adjustable, the problem is difficult, but even then the teacher may put children in those seats that are best fitted to them. If school seats are too far from the desks or are too close, it will be a simple matter, usually with the help of the older boys, to put them where they belong and fasten them to the floor. If some of the children have their feet swinging in mid-air (a serious condition often found in rural schools) blocks may possibly be found or made, to put under the feet.

If a few adjustable seats are found, they should be used only for those pupils who do not find themselves adjusted to the other seats.

But even in schoolrooms that are entirely equipped with adjustable furniture, shocking misfits are frequently seen. This may be due to the teacher's lack of appreciation of the importance of posture, lack of knowledge of the requirements of hygienic seating, or carelessness. Misfits in a schoolroom thoroughly supplied with adjustable furniture may be as violent as in the schoolroom furnished with non-adjustable seats and desks. At the very beginning of the teacher's work she should inspect all seats and desks to see that they

are properly adjusted. It would be a good plan to look over all furniture carefully at the beginning of each term.

Fatigue and posture. But even when a schoolroom is equipped with the most approved furniture and kept care-



FIG. 31. CORRECT SITTING POSTURE MAINTAINED WITHOUT ARTIFICIAL SUPPORT

A valuable exercise for developing good postural habit and for strengthening the back muscles. (From Walter's *The Principles of Health Control*, with the permission of D. C. Heath & Co.)

fully adjusted, children may form bad habits of posture because they become very much fatigued. It should never be forgotten that children are by nature exceedingly active and that after remaining inactive for a short time they become restless and fatigued. If they are not allowed to change their positions and move freely about, they are in-

clined to slip down in their seats, bend over their desks, and assume other incorrect positions.

The work of the school should be planned so as to bring in a variety of muscular activity. One or two short periods of two or three minutes' duration might well be taken between recesses for gymnastic exercises and free play by the entire school. Recitation periods ought also to be planned to bring in muscular activity. English may be taught through dramatization, arithmetic through games, and in all recitations the blackboard may be used freely. By the application of such methods the tendency to get improper habits of posture will be lessened.

The schoolroom temperature and posture. A high temperature in the schoolroom has about the same effect as fatigue. Restlessness, nervousness, and flabbiness of muscles are the usual accompaniments. If there is excellent ventilation and the air is kept cool, the muscles have more tonicity and it is easier to keep in proper position. The teacher who does not see that the temperature of the schoolroom is about sixty-eight degrees is doing much to undermine her best lessons and training in posture.

Habits conducive to incorrect posture. In connection with the school procedure there are several common habits that should be avoided. Children who are required to stand for several minutes during a recitation are often seen to stand so that the weight is shifted almost entirely to one foot. (See Fig. 32.) In such a position the left hip is lowered and the left shoulder raised, thus producing a bending of the spine to the left. This posture tends to produce a displacement of the pelvic organs and a lateral curvature of the spine. The recitation posture should be with one foot slightly in advance of the other so that the weight may be transferred from one foot to the other without any distortion of the spine. (See Fig. 33.)

Sitting with one leg over the other also tends to produce malformations because it is more difficult to maintain an erect sitting posture.

Another injurious habit which is widely prevalent among school-children is that of carrying a school-bag so that it is

proped up on one hip. To maintain the bodily equilibrium a distortion of the spine is necessary. This is a difficult habit to correct. It is becoming customary now in our best schools not to assign any home work for the grades below the seventh and eighth — a practice which might be copied with profit by country schools. Even in those grades the evil of book-carrying may be abolished to a large extent by talking the matter over with those who are addicted to the habit and suggesting that



FIG. 32

A position which no teacher should tolerate.

(From Terman's *Hygiene of the School Child*.)

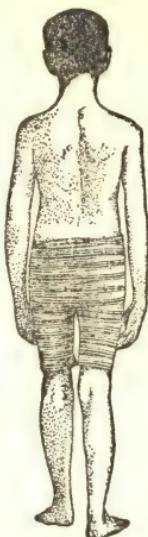


FIG. 33

The correct standing position for the recitation.

possibly not more than one or two books at the outside be taken home for study.

Ill-health as a cause of incorrect posture. Almost any kind of illness will interfere seriously with the development of good posture. I have seen some of my own pupils progressing nicely as a result of school training; and then, after a few weeks of sickness from tonsillitis or some other ailment, losing everything they had gained. Sometimes their posture might be even worse than it was before training. Near-sightedness is likewise a cause of incorrect posture. The

pupil with such a defect of vision has a marked tendency to stoop over in study and so become round-shouldered. A disease like rickets in which the bones become abnormally soft may also be a cause of various deformities including curvature of the spine, knock-knees, and bow-legs. Under such conditions the teacher can do little in the way of correction. Parents should be advised to consult a physician — if possible, a bone specialist. Sleep, fresh air, exercise, good nourishing food — everything that makes for general good health — is the foe of bad posture.

CLASS EXERCISES

1. Read as many references on posture as you can to find all the serious results from bad posture. Prepare to tell why these results naturally follow.
2. Visit some rural school and carefully observe the number of pupils in bad posture. What percentage have excellent posture? Do the textbooks used by the children consider the question of posture? Do you consider the treatment adequate? What efforts are being made by the teacher to train the children in good posture? If placed in a similar position, what would you do?
3. Write to the American Posture League, 1 Madison Avenue, New York City (enclosing stamp), for any literature which they may have for free distribution. Report on some aspects of posture not treated in this chapter.
4. What proportion of the seats and desks in the schoolrooms visited were adjustable? When were they last adjusted? Did you see any school furniture that did not fit the pupils? Did you notice any bad habits of posture which you think might have been corrected by the proper adjustment of furniture or by other means?
5. Consult books on play, physical training, and hygiene to find exercises and games that will correct bad posture. Try these exercises yourself.
6. If you find that you have bad habits of posture yourself, take proper exercises and try in every possible way to correct this defect.
7. Look over current magazines to find pictures illustrating good and poor posture. How would you use them in teaching children?

CHAPTER XIII

COMMON COLDS AND THE HYGIENE OF NOSE AND THROAT

Two thirds of all colds are infections, and due not to cold, pure air, but to foul, stuffy air, with the crop of germs that such air is almost certain to contain. They should be called "fouls," not "colds."

(*Woods Hutchinson.*)

The danger from common colds. Among the many ills which inflict mankind none is regarded as being of such slight consequence as the common cold. In reply to the question, "What is the matter?" we often get the reply, "Oh, it's nothing but a cold." Nevertheless, this is a malady responsible for much inefficiency and suffering. First of all, a cold greatly diminishes our power of enjoyment and our ability to work. Second, colds use up much of our reserve energy and so make it easier for other diseases to be contracted. To keep the body strong and well at all times is a valuable safeguard, an excellent kind of insurance. Third, colds may become chronic and one may throughout life be distressed and handicapped by nasal catarrh.

Colds contagious. Among the masses of the people colds are regarded as being as inevitable as thunder-showers or lightning. With the approach of winter their coming is expected in much the same way that the falling of snow is predicted. So far as causes are assigned for colds they are usually thought to be due to extreme cold temperature and drafts. In previous chapters we have considered drafts as quite inadequate. (See pp. 188-189.)

The proper attitude toward colds is to consider them as diseases that are "caught" in much the same way that ordinary diseases are contracted. Everybody has noticed that a particular kind of cold, if contracted by one member of

the household, often goes through the entire family. One pupil with a hard cold has been known to infect a whole schoolroom.

The teacher's problem. In planning her work for the year, the teacher should enlighten the children as to the cause and prevention of colds and also endeavor to make the hygiene and sanitation of the schoolroom such that colds will not be fostered and transferred. The whole problem of colds might be well considered at some meeting of the parent-teacher association.

Causes of colds. Two conditions seem to be necessary for colds — a congestion of the blood in the mucous membranes of the head, throat, or lungs and the presence of cold-germs. In places free from germs, as on the mountain-tops or in the Arctic regions, exposure to cold is not accompanied ordinarily by colds. On the other hand, one may have many malignant cold-germs in the throat and nose, but the mucous membranes may be so normal — free from congestion and irritation — that no cold is contracted. Whenever the mucous membranes of the body are in a congested condition and cold-germs are present, the contraction of colds may be expected.

The prevention of colds. A poorly educated skin which is so susceptible to changes in temperature that congestion takes place readily is one cause of colds. (See pp. 197-198) The nervous reflex mechanism controlling the temperature of the body may be educated by taking cold baths on arising in the morning, wearing light clothing indoors, getting plenty of fresh air, maintaining proper posture, avoiding constipation, and eating temperately. Some of these habits may be controlled to a considerable extent by the teacher, as we have already noted. The hot, dry air of the schoolroom is conducive to colds, because pupils going from the over-heated air of the schoolroom to the out-of-doors may be so

suddenly cooled off that congestion takes place. Then, too, the hot air dries the air passages and by provoking irritation leads to colds. Too much care cannot be exercised to see that the temperature of the schoolroom does not exceed sixty-eight degrees. The habit that pupils often have of wearing heavy clothing indoors needs to be regulated. If



FIG. 34. DEATHS FROM PNEUMONIA, BRONCHITIS, COLDS, AND GRIP IN NEW YORK CITY

(Courtesy of the Department of the City of New York.)

the room is properly heated there is little reason for the clothing being much heavier than during the regular summer weather. The adjustment to the cold weather out of doors may be made satisfactorily by putting on heavier clothing.

One significant cause of colds is a lack of fresh air and exercise. The proper ventilation of the schoolroom and play in the open air are excellent preventives. Then, too, children should be encouraged to thoroughly ventilate their bedrooms and bedclothes each morning and to sleep with their windows open at night.

Since colds are contagious, there should be the same precaution taken against them as against any disease. The use of the common drinking-cup, the common towel, swapping food, exchanging pencils that have been in the mouth, sneezing into the surrounding air, are all means of transferring colds. During the season of the year when colds

are most prevalent, children should be especially instructed in regard to those things. Children should know particularly that it is dangerous to eat before the hands have been washed.

A strong, healthy body is the foe of colds as well as other forms of disease, so that anything that makes for general good health, such as sleep, nourishing food, exercise, fresh air, etc., will prevent colds.

Any child who has a tendency to catch cold easily should consult a physician. The trouble may be due to diseased tonsils or a chronic inflammation of the throat.

Treatment of colds. Every child should be instructed as to what to do when a cold is contracted. This topic may well be taken up in class, but the teacher may be able to continue this instruction effectively by asking children who are coming down with colds or have colds what they are doing for them. Previous instruction may then be recalled with profit, accompanied by suggestions by the teacher.

As soon as a cold is felt coming on, prompt measures should be taken, for if the cold once secures a good hold it is more difficult to dislodge and may drag along for weeks or even months. Often a cold, if not checked, may leave the body in such a weakened condition that there may be fresh infections over a long period of time. The first thing to do when a cold is coming on is to relieve the congestion. One should eat sparingly, take a laxative so that there may be free movements of the bowels, take plenty of rest and sleep, keep the body warm, and possibly before retiring take a hot bath. If the cold fastens itself upon one, remaining in bed for a day, eating sparingly, and taking more than the usual amount of sleep for a few days will often be found to be effective. Many people are negligent about caring for colds, and carry out their plans of business and pleasure in the regular way.

Importance of nose and throat hygiene. A healthy condition of the nose and throat during childhood is of the greatest importance; for it is now known that diphtheria, scarlet fever, measles, mumps, whooping-cough, infantile paralysis, influenza, pneumonia, and tuberculosis all gain entrance through these passages. Even after one has recovered from these diseases the germs may be carried in the nose and throat and be a menace to the health of those with whom the person comes into contact.

The nose and throat are provided with safeguards against the invasion of disease. Among these are the tonsils. One of these, the pharyngeal tonsil, located in the back part of the nose, when swollen and inflamed is often referred to as an adenoidal structure. (See illustration opposite p. 243.) The lingual tonsil is located at the back part of the tongue. The hairs of the nasal passage, the mucous secretions, and the ciliated cells of the nose and bronchial passages offer further resistance to disease.

Healthy tonsils offer resistance to disease, but infected tonsils lose this power, and harbor disease germs and poisonous products. It has been demonstrated only recently that germs, in an acute or chronic inflammatory condition of the nose and throat and mouth, may be carried to different parts of the body and give rise to a variety of diseases which have long perplexed physicians. One of the most common of these head infections is tonsillitis, followed by decay of the teeth and nasal catarrh, especially when the inflammation extends to the cavities of the face and forehead. Such infections are now identified with rheumatism, Bright's disease of the kidneys, ulcer of the stomach, inflammation of the gall-bladder, appendicitis, etc. Of course these remote diseases are not always a result of throat, nose, and mouth infections, but there is convincing evidence to show that there is a causal relation between the two. In the light of

the evidence the need of a healthy condition of the throat, nose, and mouth is imperative.

The relation of adenoids to health and disease. Adenoidal growths tend to close the Eustachian tubes which lead to the ears and so cause deafness. As they also interfere with the passage of the air through the nose, they lead to mouth-breathing. This is of the utmost importance because the nose is especially adapted to its work. It filters, moistens, warms the air, and so makes it ready for the lungs. The mouth can do none of these things, so that a child with adenoids is at a marked disadvantage. Dr. Terman says, "Mouth-breathing lowers mental efficiency, causing apathy, dullness, nervousness, instability, etc., with consequent school retardation." There are many cases on record of pupils poor in scholarship and criminal in their tendencies who were restored to healthy normal beings after their adenoids were removed.

What the teacher can do. A child who breathes through his mouth and is troubled with many colds may be suspected of having enlarged tonsils and adenoids. Frequently both of these troubles occur at the same time. When the teacher has such suspicions there is perhaps little that she can do to better conditions. If there is medical inspection, the teacher may ask the physician to make a special examination to find whether there is a basis for her suspicions. Parents may then be notified in the usual and legal manner. If there is no medical inspection, the difficulty is greater, but the teacher may find an opportunity to convince the parents that the child should be examined by a physician. One teacher in a rural school had this experience: The mother of a boy of twelve complained because her boy was not doing better in school. She did not blame the teacher for his backwardness, but seemed to be anxious to find out what the trouble was. In the course of a half-hour's con-

versation the teacher told the mother about her suspicions. As a result the boy was taken to a specialist who operated for both enlarged tonsils and adenoids. To the mother's great joy the boy soon improved in his general health and school work. The more the teacher gains the confidence of parents the greater will be her opportunity to influence them.

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2. Hough & Sedgwick. *The Human Mechanism*, pp. 380-95. Ginn & Co.
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4. William S. Sadler. *The Cause and Cure of Colds*, pp. 147. McClure.

CLASS EXERCISES

1. Keep a record of the conditions under which colds were contracted by yourself and the other members of your family. In how many cases do you think there was evidence to show that the colds were due to infection?
2. Outline a talk which you might make at a parent-teacher association to show how parents can coöperate with the schools to prevent colds.
3. In visiting schools make note of the conditions favorable to the development of colds. In the schoolrooms that you visited do you think of anything additional which the school might do to prevent colds?
4. Do you know of children who were operated on for adenoids? What was the result on health and school work?
5. The teacher is often met with the contention on the part of parents that it does no good to operate for tonsils and adenoids, because they "come back." What are the facts in the matter?
6. What percentage of the pupils in your school or in those visited sleep with their windows open?

CHAPTER XIV

THE CARE OF THE TEETH

Of all the diseases of childhood, dental *caries* is the most susceptible to preventive treatment. This preventive treatment is very largely a matter of education. (*Dr. Guy S. Milberry.*)

There seems to be no doubt in the minds of the most judicious that the situation is serious, and that dental disease is the most widespread disease now afflicting civilized nations. With this in mind every teacher in our land has a civic duty to perform in helping to better conditions. (*Dr. Fletcher B. Dresslar.*)

The relation of the teeth to the health of the child. There are at least two reasons why sound teeth and a clean mouth are important to the growing child. First, the teeth have an important function to perform in chewing the food thoroughly so that it may be well digested. If this function is interfered with, the child may suffer from indigestion and malnutrition. During the years when he should be getting a strong physical body, his health is being undermined. Artificial teeth may take the place of natural teeth to some extent, but it is estimated that their mastication efficiency is only one tenth that of the natural teeth.

Second, the loss of the teeth through the ordinary process of decay is a means of infecting the body with disease. Germs require for their growth and multiplication warmth, moisture, and food. In the mouth they find a virtual paradise. There they breed in profusion, destroying the teeth, infecting the gums, the tonsils, the stomach, and other parts of the body. In the previous chapter emphasis was put on the danger to health from any kind of bodily infection. Decayed teeth not only become useless in the mouth for purposes of mastication, and are painful, but they are

also one of the causes of acute rheumatism, chronic joint diseases, heart disease, ulcerated stomach, etc.

Dr. B. J. Cigrand once read a humorous article, entitled the "Menagerie of the Mouth," which was not greatly exaggerated. A portion of it runs as follows:

"Menagerie," meaning a place where wild things are enclosed, fits the conception of the wild, devouring lives enclosed in the oral cavity. Visit an enlarged mouth and there view the great army of animalculæ held captive in the oral cavity. Treating the human ora as a circus, visit the cages, that is, the cavities, and hurriedly walk with the crowd to note the varieties of microscopic lives that are on exhibition daily and nightly — without intermission. The show is continuous; the performers are cheered on in their work by string music called the human voice, and now and then the trainer, with a big toothpick, stirs up the animals. The canopy, encircled by hanging enamel cages, presents a beautiful dome. The floor of the circus, the tongue, is covered with the softest carpet. It has an additional new circus feature, as it admits of elevating the audience to the upper row or gallery of cages. The animals are alive, eat, sleep, and rest. They have foods of special delight; some love the dry land and others the deep blue sea. These millions of small lives eat candy, peanuts, crackerjack, and caramels. Without these accessories no circus could exist. The infinitesimal life present in the oral cavity measures more millions than there are people in all countries. When these microbes begin to perform, the "stunts" are called tuberculosis, typhoid, scarlatina, rheumatism, influenza, diphtheria, pneumonia, and half a hundred other names.¹

Few people would imagine that many patients in a general hospital could possibly be there because of mouth infections; yet Dr. White, acting head of medicine in the University of Minnesota Medical School, reported that twelve per cent of the patients admitted to the hospital were suffering from conditions due to mouth infection. This report was made

¹ Quoted from Downing's *Oral Hygiene—Where It Begins and Where It Leaves Off. Proceedings, American School Hygiene Association, vol. vi, p. 265.*

after two years of carefully checked evidence. Dr. William Osler expresses the belief that more physical degeneracy can be traced to the neglect of the teeth than to the abuse of alcohol. A further review of medical literature is not necessary to show the fundamental importance of a healthy mouth. The United States Government recognizes this in its rejection of men with defective teeth for service in the army and navy. Those in the service are under the care of skillful dentists.

Defective teeth related to defective scholarship. It requires little imagination to understand that if decayed teeth are responsible for the physical ills mentioned, they must also be responsible for defective scholarship. A body weakened by poor digestion and poisonous products does not make for a well-nourished brain and efficient mental activity. A good deal of evidence has been collected to show that children in poor health, troublesome to discipline, and backward in school have been restored to a normal mental and physical condition through the correction of dental defects. One case cited in the practice of Dr. W. M. Bartlett will serve as a typical illustration. Dr. Bartlett says:¹

Another child came to my office with his mother and made an appointment for dental services. He arrived twenty minutes late for the appointment and when he was taken to task about it, said, "One of the boys said I made a face at him and my teacher kept me in for it; that is why I am late." I told him that he should not make faces and he said, "I just can't help it." I said nothing more, and upon examination of that child's mouth, saw plainly why he could not refrain from making what his classmates call "faces." I found in the two first lower molars large occlusal cavities, each containing a hypertrophied pulp rising at least one sixteenth of an inch above the tooth, which forced the child always to keep his jaws apart, using only his anterior teeth to nibble with, so to speak. At times when bringing the jaws into occlusion, the pain from these

¹ W. M. Bartlett, D.D.S. *Dental Ills and Scholarship, Oral Hygiene.* Boston.

pulps would cause him to jump and squirm, which the other children considered "making a face." I asked the boy how he managed to eat. His reply was that he only ate soft things that he could bite on his front teeth. I next asked him how he was getting along at school and was told that he was always kept in and nearly always last in his classes. This condition had existed for months. In a short time I had relieved the conditions and attended to the teeth properly. He returned to me in six months for other services and in that time he had developed into a strong, vigorous boy. He stated that he was never kept in and had made such progress in his studies that he had jumped two grades, which was considered good work. This case in itself shows the importance of dental hygiene in schools.

Condition of the teeth of country children. Dr. Terman says that one fifth of the teeth of our school-children are diseased and that ninety per cent of these children have one or more decaying teeth. This alarming condition is being dealt with in all of our larger cities where there is medical inspection, follow-up work with school nurses, and careful instruction and training of the children in the care of the teeth. In the cities much has been done to make the general public familiar with the need of the care of the teeth. Medical schools, hospitals, and clinics have established practically free treatment for thousands of children who are too poor to consult a regular dentist.

In the country, however, the situation is much different. Little has been done to educate the general public; children receive little practical training in the schools on the care of the teeth; medical inspection is almost nil and free clinics are lacking. It is not surprising, therefore, that Dr. Thomas Wood and other able investigators have discovered that the teeth of country children are in a worse condition than those of city children.

Examination by the teacher. To understand the nature and scope of the dental problems in her school the teacher

should examine the teeth and mouths of all the children shortly after she begins her work. (See chapter V.) Such an examination should enable her to find out whether every child's teeth are free from decay in general and whether they are properly cleaned. By questioning the pupils she will also find out about their habits with reference to the teeth. Such information will enable her to pay particular attention to those pupils who have unsanitary mouths, to see that they are properly cleaned. When teeth are decayed, parents should be advised to consult a dentist. As many parents are ignorant of the importance of the care of the teeth, it would be excellent to discuss this topic at one of the parent-teacher associations.

Importance of the first set of teeth. Most parents and children have the false notion that it is of slight consequence if the first teeth decay, since they are destined to fall out anyway and be replaced by permanent teeth. In a parent-teacher association where this question is brought up, it would be well to have it emphasized that the milk teeth need careful attention for these reasons: first, the milk teeth are needed to masticate the food; second, decayed teeth tend to infect the tonsils and different parts of the body and thus lay the basis for disease; and, third, if the first teeth are not cared for, the decay may spread to the permanent teeth in much the same way that one rotten apple will rot a good apple with which it may be in contact. The importance of the six-year molar should therefore be brought to the attention of children and parents.

Importance of the six-year molar. This tooth is the first one of the permanent set to appear. It is found next to the outer molar of the milk set and may be found by counting, beginning with one of the central incisors (one of the two prominent chisel-shaped teeth in the front of the mouth) and counting toward the back of the mouth. The sixth

tooth is the six-year molar, which ordinarily appears in the sixth year. It is often entirely neglected because the time of its appearance is unknown and it is not realized that it is a permanent tooth. Often the molars of the first set through neglect become decayed, and the decay naturally extends to the six-year molar, which is finally so troublesome that it is extracted. In many schools where the teeth of school-children have been examined pupils have been found with one or more six-year molars hopelessly decayed or missing. They can never be replaced and the missing teeth tend to mar the symmetry of the face.

Toothbrush drills. The teacher may do little in the way of getting parents to take their children to the dentist, but she can help the cause immeasurably by training children to clean their teeth. Two things are of vital importance, namely, that children be taught to brush their teeth in the right way and that this method be practiced with regularity until it becomes a habit. Not only do many pupils lack a toothbrush, but those who have them often use them in such a manner as to injure the gums, or so carelessly that the teeth are not well cleaned. The usual way to clean the teeth is to scrub back and forth across them. This method is bad because too much force is usually applied and the necks of the teeth are worn and the gums often injured so that decay is facilitated. While a very moderate amount of such brushing may be commendable the best method is the massage method, in which the gums get a large amount of massage from the side of the brush. To try this method on the upper jaw, the brush should be inserted as high up as possible so that the bristles point straight up; then it is pressed hard against the gums, and as it is brought downward, it is turned toward the teeth and down. On the lower teeth the manner of brushing is just the reverse of the upper. The brush pointed downward, is placed as far down on the

lower gums as possible, with the side of the brush pressed tightly against them, and is then brought up, turning until the bristles point up. The inside surfaces of the teeth are treated in the same way, although it is a trifle more awkward at first. The front teeth are cleaned inside by hooking the heel of the brush behind the teeth and then pulling out. By such methods it will be noticed that as the brush is turned slowly from its side the bristles spring into the spaces between the teeth and if anything is present it is brushed out. The massage method also prevents the receding of the gums from the teeth, a frequent cause of decay.

In the schools of New York City the toothbrush drill is a prominent feature of the work in hygiene. It is described in the New York City Course of Study in Hygiene for 1914 as follows:

Two or three children, provided with toothbrushes, dentifrice, cups, water, and a basin, should demonstrate this drill before the class. Every member of the class should follow the leaders in pantomime.

Attention! (All in line, elbows close to side, with brushes in right hand and cups in left.)

1. *Ready* — Dip!

2. *Outside surfaces*. (Brush inserted under cheek, teeth closed.
Brush gums as well as teeth.)

Left side — Ready — Count 1 to 16. Dip.

Right " — " — " " " "

Front " — " — " " " "

3. *Inside surfaces*. (Mouth wide open, straight motion front to back.)

Upper left side — Ready — Count 1 to 16. Dip.

right " — " — " " " "

front " — " — " " " "

Lower left " — " — " " " "

right " — " — " " " "

front " — " — " " " "

4. *Chewing surfaces* (scrubbing vigorously).

Upper left side — Ready — Count 1 to 16. Dip.

right " — " — " " " "

- Lower left side — Ready — Count 1 to 16. Dip.
 right " — " — " " " "
5. Empty cups and refill them — Ready — Count 1 to 16.
 6. Rinse mouth — " — " "
 7. Rinse brush — " — " "

(Shaking off excess of water over basin.)

N.B. — Counting by leader should be rather brisk but even, and should allow plenty of time for dipping and shaking of the brushes.

Materials.

1. Toothbrushes (brought to school in envelopes made by leaders.)
2. Dentifrice.
3. Individual cups (paper preferably), made by the leaders at home, to be half filled with water by monitor.
4. One pitcher of water.
5. One tin basin.

In addition to the toothbrush, dental floss (waxed silk thread) should be used every day or so to remove particles of food lodged between the teeth, where decay is common. Dr. Wood also recommends that the mouth be washed with lime water once a day. This lime water may be prepared by putting one half a cup of finely powdered unslaked lime into a quart of water. After it has stood for twenty-four hours the clear liquid should then be poured into a bottle for mouth wash. The powder may be used for successive solutions until entirely dissolved.

To get children merely to repeat directions on the care of the teeth would have little educational value. There must be an actual demonstration of the way to use the toothbrush, a drill by the pupils under the direction of the teacher, and finally some follow-up work by the teacher to see that the habit has been established. The teacher, provided with her own toothbrush, a cup, tooth-powder, and a basin, should first explain and demonstrate just how the

teeth are to be brushed. After this a member of the class may give a demonstration, the others imitating the movements with an imaginary toothbrush. If the class is small, all the pupils may take part in the actual demonstration, but ordinarily a demonstration by two or three in a class will be sufficient. If the number of pupils in the school is small, the entire school may take part in the drill. The initial step in the formation of the habit having been taken, the next step, the crucial part of the process, is to get the pupils to practice cleaning the teeth daily until it becomes habitual. The teacher may follow this up by the careful study of health records and also by a daily inspection of the teeth until the habit is well formed. Calling the attention of the school to those who have kept their teeth in the best condition will offer an incentive often to those who are careless about the cleaning of the teeth. Eventually children ought to be as proud of keeping their teeth clean as of making a high score in jumping or in some game. The author remembers with pleasure visiting a school in one of the poorer sections of a large city. The principal took him around to the various rooms and asked him to look at the children's mouths. There was a distinct feeling of pride on the part of the children as they exhibited their clean teeth.

To get children to take proper care of their teeth it is desirable that they be supplied with toothbrush and powder. Many do not possess these essentials, but with patience and tact the teacher may overcome such difficulties. Toothbrushes are inexpensive so that parents will usually purchase them. Sometimes children may be urged to save a few of the pennies which they spend for candy and buy a toothbrush and powder. Often manufacturers of tooth-powder advertise to send any teacher enough samples of powder or paste to supply each child with a small tube. With such help the habit of cleaning the teeth may be begun. It should be

said, however, that tooth-powder is not absolutely necessary. Water made salty to the taste or plain precipitated chalk will answer.

Dr. Goler¹ suggests the following formula for a good tooth-powder:

Powdered chalk.....	1 lb. (costs about 20c.)
" castile soap.....	3 oz. (" " 10c.)
" sugar.....	2 oz. (" " 1c.)
" orris root.....	2 oz. (" " 10c.)

Take all of these substances and mix them together on a large sheet of paper, stirring them about with a table knife, and holding up first one side of the paper, then the other, until all the powder is thoroughly mixed. Then put it through a flour sieve. You will thus be able to make a pound and a half of tooth-powder for about forty cents.

Every teacher who remains one year in a rural school ought to be able at the close of that year to point to tangible results in dental hygiene.

CLASS EXERCISES

1. Find out whether any survey has been made in your State which shows the condition of the teeth of country children. How do these investigations compare with the investigations made in city schools in the same State?
2. Can you think of other motives besides the ones suggested in this chapter to present to children to get them to clean their teeth?
3. Look over the advertising columns and the regular reading columns of current magazines for illustrations and reading matter which could be used to teach children to clean their teeth.
4. Present arguments which you would use to convince parents that the care of the first set of teeth is necessary.
5. Look up such common mouth infections as "gum boils," "ulcerated teeth," etc., and note the relationship which they bear to a neglected mouth.
6. Find out how many of your pupils have ever consulted a dentist. If you do not have a school of your own, visit a rural school, and find

¹ *Teeth, Tonsils, and Adenoids*, Metropolitan Life Insurance Company, New York. Pamphlet free to teachers.

out if possible how many of the children have ever seen a dentist. How frequently should a dentist's services be required for a moderately well-kept mouth? Why?

7. Instruct your children carefully as to the dangers of such doubtful "remedies" as toothache gums, salves, and ointments. Lead them to an appreciation of the fact that a well-kept mouth never requires such drugs.

CHAPTER XV

THE HYGIENE OF DIGESTION AND FOODS

Nutrition is fundamental for all lines of child development.
(*Dr. Lewis M. Terman.*)

INSTRUCTION relating to digestion and foods is usually limited to a discussion of the organs of digestion and their work. Pupils learn a great deal *verbatim* from the textbook about the coats of the stomach, the length of the intestines, the function of the liver and pancreas, and the action of the different digestive juices. Often the instruction ends at this point.

Information acquired should have practical bearings. Many of the facts suggested should be presented, but they need to be related to practical hygiene. In the study of mastication, for example, the subject should be discussed in such a way that the children will get suggestions as to the care of their own health. Facts such as these should be emphasized: The mechanical process of crushing the food facilitates the action of the saliva and the gastric juice. The chemical process of changing the starch into sugar is due to the action of the saliva; this is of fundamental importance, because starch will not pass through the walls of the digestive tube and be absorbed into the blood. The vigorous use of the teeth and jaws in mastication makes the teeth healthy and prevents decay. Enjoyment of the food which accompanies thorough mastication, appetizing food, and a pleasant state of mind also stimulate the flow of the gastric juice and so aid digestion in the stomach. As a result of the study of mastication, children should finally be led to formulate from the above facts such hygienic principles as

Chew the food thoroughly.

Eat appetizing food.

Eat plenty of food that requires vigorous mastication.

Be cheerful at mealtime.

As the study of digestion is continued children should get facts so organized that they can answer such questions as the following:

Why is fried food difficult to digest?

Should milk be sipped, or swallowed like an ordinary glass of water?

How does exercise influence digestion?

What is the effect of bad posture on digestion?

Why is regularity in the movement of the bowels necessary for health?

Should we drink plenty of water? Why?

How does a pleasant state of mind promote digestion? What can be done to make mealtime the most pleasant part of the day?

Why are foods with bulk, like cabbage, desirable?

Could one have plenty of food and yet be poorly nourished?
Explain.

Why are fruits valuable in the diet?

What is the result of over-eating?

Practical information insufficient. But even after the teacher has so organized the information that the pupils can answer many practical questions and formulate the most reliable hygienic regulations, the instruction may be largely valueless, because, as has been said so often in this volume, understanding has to run the gantlet of deep-seated antagonistic habits. The inertia of years needs to be overcome. Children need to be trained in the right kind of action. The health surveys of the country districts are practically all alike in concluding that country people and country children are badly nourished, even though they live in the midst of plenty. This is due in large measure to their ignorance of food values, of the need and method of preparing a balanced ration, and of skill in cooking food properly. One

writer of hygiene has written a book entitled *Starving America*, in which he attempts to prove with much success that America is starving for the want of good food just because it does not know what good food is and how it is to be gained. This is probably more true of rural than of city communities. A reform cannot be brought about simply by children reading about these problems or listening to the teacher as she talks about them. This tremendous problem concerning foods is not to be solved except as children grapple with some actual needs. Solving the problem of "What to Eat" will make for a coming generation with more vigorous minds and bodies and greater power to serve themselves and their country.

The teacher as a community leader in food conservation. The great European War has done much to make people realize the importance of a good diet. The requests and demands of the United States Food Administration have made a knowledge of the different kinds of foods and their proper preparation a necessity. It is safe to say that never before in the history of our country has there been such a profound interest in the whole subject of nutrition. Both State and National Governments have published numberless pamphlets and recipes, and have tried in many ingenious ways, such as sending out lecturers and contributing to newspapers, to educate the general public.

Rural communities obviously have not had the same opportunities to consider such matters as have those living in the city. Here is a splendid opportunity for the teacher to play a large part in the conservation movement in the community. She may easily collect a large number of free Government pamphlets on food and file them at the schoolhouse for the reference of pupils and parents. A domestic science club, which would meet at the schoolhouse, might be formed, or many of the meetings of the parent-teachers'

association might well consider the question of foods. Papers might be read, new recipes distributed, and ideas on economy, cooking, the balanced ration, and similar questions, might be exchanged. Such meetings would naturally lend vigorous support to any plan which the teacher might inaugurate in the school, such as serving hot lunches, getting

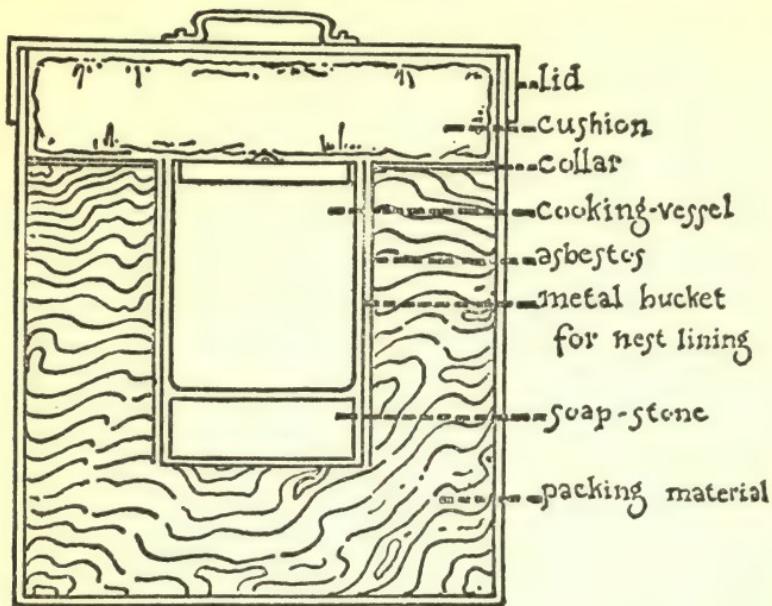


FIG. 35

the height and weight of the children to find out whether they were below normal (see pp. 63-68), and enlisting the coöperation of parents.

One teacher known to the author made, with the assistance of the children, a fireless cooker which was demonstrated with great success in the preparation of the school lunches. The mothers became so interested that the teacher was advised to give an evening demonstration to show how the cooker was made, why it economized fuel, and required less work.

How to make a fireless cooker. The fireless cooker is practically indispensable for every household. It saves fuel in winter, makes the kitchen comfortable in summer, and saves time and labor. The United States Department of Agriculture (Food Leaflet no. 13) says that a fireless cooker may be made for about a dollar, and gives the following directions for construction:

MATERIALS NEEDED FOR A FIRELESS COOKER

(From *United States Food Administration Leaflet No. 13*)

1. *The outside container:* Any good-sized box or bucket with a tight cover — a grocery box, a butter firkin, a wooden candy bucket, a 100-pound lard-can, or a new garbage-can.

2. *Packing material:* Soft hay, excelsior, ground cork, sawdust, tightly crumpled newspapers, or any other good non-conducting material that can be packed in closely. This packing material forms a nest for the cooking vessel.

3. *The nest lining:* A metal or enamel bucket and sheet asbestos to cover the bucket. The bucket must have straight sides and a lid and must be of such a size as to allow at least three inches of packing material between it and the outside container, top, bottom, and sides.

4. *The cooking-vessel:* A vessel with a tight lid to fit closely into the nest lining and yet slip in and out easily, or two or three of the small ones especially made for the fireless. The best kind is of enamel, granite, or aluminum.

5. *Cardboard:* To make the collar.

6. *The cushion:* Denim or muslin stuffed with the packing material. This cushion is to be pressed down across the top under the outside lid.

7. *Two soapstone disks:* Purchasable at a hardware store. They are not needed for all cooking, but with them you can cook more quickly and in greater variety.

TO MAKE THE FIRELESS COOKER

1. Line the outside container with newspaper if a wooden box is used.

2. Pack the bottom of the outside container compactly with a layer of the packing material to the depth of three inches or more.

3. Cut a circle of asbestos two inches larger in diameter than the nest lining. Place the asbestos mat in the center of the packing.

4. Cut a strip of asbestos big enough to cover completely the outside walls of the bucket which is to serve as the nest lining, and tie it in place.

5. Place the bucket with its asbestos covering directly in the center on the asbestos mat. Hold in place and tightly fill in the space between it and the walls of the outside container with the packing material. Pack in solidly to within one-half inch of the top of the bucket. The success of your cooker depends largely upon the tightness with which you crowd in the packing material, which prevents the heat from escaping from your hot food.

6. Cut a piece of cardboard to fit in the outside container. Cut a hole in the middle of it which will fit closely over the bucket which forms the nest lining. This "collar" holds the packing material in place.

7. Make the cushion for the top by cutting two pieces of cloth the size of the outside container and putting them together with a straight strip of cloth three inches wide. Stuff with the packing material.

8. Outside finishings. If a box is used for the outside container, the lid should be hinged and fastened down with a hook. If it is of wood, paint or stain it a dark color. Casters make it convenient to move about.

SOME PRECAUTIONS IN USING THE FIRELESS

Don't let the food or disks cool before you put them in the fireless. The food will not cook unless there is enough heat shut up with it. Reheat the food that requires long cooking, if it cools before it is finished. Reheat the food before serving, if necessary. A small quantity of food cools quickly, so either use the disks or put a small vessel containing the food in the regular cooking-vessel and surround it with hot water.

Soapstone disks will increase the usefulness of your cooker. They can be heated hotter than the boiling point of water and when shut up in the fireless furnish heat which cooks the food. If you made your fireless according to directions, you can safely use the disks. Heat them very hot, but do not let them get red hot for fear of cracking. With one below and one on top of the

cooking-vessel you will be able to roast meat or even to bake bread or puddings. Without the disks your fireless is useful only for certain kinds of food — cereals, beans, pot roasts, stews, etc. — things that can be cooked in water.

For recipes especially adapted to fireless cooking send to United States Department of Agriculture, Washington, D.C., for Food Leaflet No. 13 and Farmers' Bulletin No. 771, *Homemade Fireless Cookers and Their Use*.

Hot lunch at noon. One of the most effective ways to study the question of the selection and cooking of foods, and to inculcate good hygienic habits, is to have a hot lunch at noon planned, prepared, and served by the pupils themselves. In most schools the pupils bring their lunches from home. These are not only cold, but often are far from being suitable for growing children. The hot lunch should be made to supplement the box luncheon from home. If the teacher will bring these matters up before the parents at the parent-teacher association, some kind of control may be gained over the kind of luncheon sent from home. Mothers are invariably interested in the idea of the hot lunch, because they believe it will not only be healthful for the children to have something warm, but they are relieved in large measure of the preparation of the box luncheon.

Recognized benefits from hot lunches. In our city schools the hot-lunch plan has now demonstrated its worth and has been universally accepted throughout the country. Usually in city schools the children have little or nothing to do with planning the lunches. They merely buy what they need at a counter. The advantage has been that the children were able to get warm, nourishing food for a few pennies, and as a result their health and school work have improved. In rural schools, where often there is no course in domestic science, the hot lunch may be utilized to teach children many valuable things about foods and cooking. The teach-

ers of the State of Oregon who had served hot lunches, in reply to a questionnaire said that they believed the hot lunch had these advantages:

1. Enables the pupils to do better work in the afternoon.
2. Adds interest to school work.
3. Gives some practical training.
4. Gives better balance to meal.
5. Encourages pupils to take sufficient time to eat.
6. Teaches neatness.
7. Gives opportunity to teach table manners.
8. Makes for greater efficiency.
9. Aids digestion as compared with a cold lunch.

Securing the equipment. To get the proper equipment may seem to many teachers almost impossible; yet this is relatively a simple matter if the teacher possesses tact and a little ingenuity. If the school board does not feel inclined to purchase the necessary things, most of them will usually be donated by the homes as soon as mothers understand the teacher's purpose. After the pupils of a school become vitally interested in the idea of having hot lunches, the teacher and pupils should make out a list of the equipment necessary. Then the children can make the necessary inquiries at home. If a parent-teacher association has been organized, the list might well be presented there and the coöperation of the mothers directly secured. Teachers may get a good idea of what kind of equipment is needed for serving ten lunches by referring to the following list recommended by the Oregon Agricultural College Extension Service in its bulletin *The School Luncheon*:

1 box for table (constructed from new material).....	\$ 5.00
2 tin dish pans.....	.30
1 double boiler, large.....	.50
1 paring knife.....	.05
1 case knife.....	.05
1 fork05

*12 tablespoons.....	\$.60
*12 teaspoons.....	.50
1 wooden spoon.....	.05
2 mixing bowls.....	.50
2 saucepans, covered.....	.50
1 salt shaker10
1 Dover egg beater.....	.25
1 can opener.....	.10
paper napkins.....	.10
paper.....	.25
tin container.....	.50
*12 small soup bowls.....	1.50
*12 small bowls for cocoa.....	1.20
*12 small plates.....	1.20
stove	_____
Total.....	\$13.20

* One small soup bowl, cup and plate, 2 spoons for each pupil.

It often happens that somebody has discarded an oil stove which is still usable, but is too small for family use, and this may be donated or rented for a very moderate sum. The regular heating-stove may often be used to advantage.

In addition to the stove and cooking-utensils there should be some kind of cupboard for the storing of utensils, paper towels, and food-supplies, and a work-table. The cupboard need not be at all elaborate, but it should be free from cracks and be screened against flies. An old-fashioned kitchen safe would do, or a cupboard might easily be made from a dry-goods box by putting in shelves and using the lid for a door. Small bits of leather may be used for hinges if metal hinges are not obtainable. By covering the door and the other parts of the box in view with oilcloth, the cupboard will have a much more presentable appearance. Probably somebody would be glad to donate a table, but if one cannot be readily secured in this way the teacher and pupils may easily make a satisfactory table out of dry-goods boxes. Shelves may be put in underneath so that a cupboard is

unnecessary. This makes for economy of space, which is always necessary in rural schools. Such tables may be made attractive by sandpapering and painting.

Planning the lunches. There are several methods for securing food-supplies. In exceptionally few cases members of the school board or patrons of the school have furnished the money for this purpose, but usually the teacher will find it advisable at the beginning to get parents to furnish the food. Each pupil may volunteer to furnish the lunch for a particular day. To insure fairness a simple record should be kept. It is advisable to have the lunches planned for some time in advance, as it will make it easier for the housewives and more educative for the children. After the hot dishes have been decided upon, the children may plan what they will bring from home. Here is a chance for a practical study of dietetics. Children should be taught to select the right kinds of food according to their uses in the body. Foods may be grouped into five different classes according to their uses. First, there are the fruits and vegetables, which contain mineral substances needed for building up the body and keeping it in good condition. They contain acids which give flavor and prevent constipation. By giving bulk to the diet they are also more satisfying to the appetite and help to stimulate the peristaltic movement of the intestines. Second, there are the meats and the meat-substitutes (beans, peas, lentils, cowpeas, peanuts), which are rich in protein, an absolute necessity for the growth and repair of the body. In the diet of children there should always be some protein in the form of milk. Third, the foods rich in starch, such as cereals (wheat, rice, barley, oats, corn, and rye) and potatoes, supply energy. Fourth, the sugars serve as fuels for the body and help to flavor the food. Fifth, the foods rich in fats (bacon, salt pork, butter, oil, lard, cream, etc.) also serve as fuels and improve the texture of the food. In every

meal there should be a balanced ration; that is, each one of the five different kinds of foods should be represented. Now, let us return to the thought expressed in this paragraph, that children should be taught to choose the right kinds of food according to their uses in the body. If baked beans are to be had for the noon lunch, it would be unwise and unhygienic for children to bring from home cheese or meat. Fruit or vegetables would be better. Teaching of this kind is quite likely to have an effect upon the dietetic customs of the home.

Below are given some of the common food materials classified under these five different headings.¹ If the teacher and pupils will consult them in planning a meal a healthful and varied diet may be secured:

GROUP 1. FOODS DEPENDED ON FOR MINERAL MATTER, VEGETABLE ACIDS, AND BODY-REGULATING SUBSTANCES

Fruits :

- Apples, pears, etc.
- Bananas.
- Berries.
- Melons.
- Oranges, lemons, etc.

Vegetables :

- Salads — lettuce, celery, etc.
- Pot-herbs or greens.
- Potatoes and root vegetables.
- Green peas, beans, etc.
- Tomatoes, squash, etc.

GROUP 2. FOODS DEPENDED ON FOR PROTEIN

- Milk, skim milk, cheese, etc.
- Eggs.
- Meat.
- Poultry.

- Fish.
- Dried peas, beans, cowpeas, etc.
- Nuts.

GROUP 3. FOODS DEPENDED ON FOR STARCH

- Cereal grains, meals, flours, etc.
- Cereal breakfast foods.
- Bread.
- Crackers.
- Macaroni and other pastes.

- Cakes, cookies, starchy puddings, etc.
- Potatoes and other starchy vegetables.

¹ See United States Department of Agriculture, Farmers' Bulletin No. 808, pp. 9, 10.

GROUP 4. FOODS DEPENDED ON FOR SUGAR

Sugar.	Candies.
Molasses.	Fruits preserved in sugar, jellies, and dried fruits.
Sirups.	
Honey.	Sweet cakes and desserts.

GROUP 5. FOODS DEPENDED ON FOR FAT

Butter and cream.	Salt pork and bacon.
Lard, suet, and other cooking fats.	Table and salad oils.

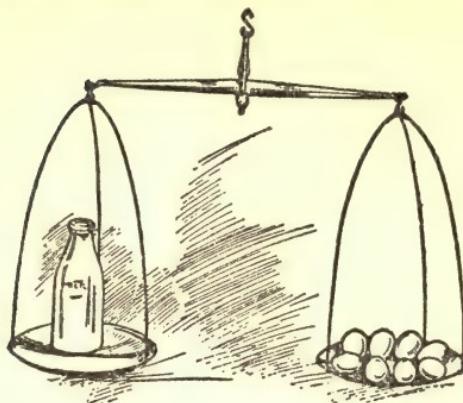
The planning of the lunch also gives an excellent opportunity to introduce some practical instruction on how to cook different dishes. Different pupils may be assigned to do particular things in preparing the midday meal.

Many of the studies made of the health conditions in the country show that people in rural districts do not half appreciate the value of milk in the diet. (See p. 20). It is particularly valuable for children. Although it is plentiful on farms, parents often do not realize that milk is one of the cheapest, most nourishing, and most easily digested of all foods. Children should be instructed in these facts, and recipes requiring milk should be suggested to them and tried out in the lunches. Milk seems to be valuable in the diet as Dr. Caroline Hunt (*School Lunches*, Farmers' Bulletin, No. 712) has pointed out, not only because it contains nourishing substances and promotes growth but also because it seems to help children to make use of other foods. The neglect of milk in the diet of rural school children may explain in part the results of recent investigations which show the inferiority in height and weight of country children as compared to city children. The eminent authority, Milton J. Rosenau,¹ has this to say about milk as a food:

¹ *All About Milk*. Metropolitan Life Insurance Company, New York. This may be secured by teachers free.

MILK AS A FOOD

What is the food value of a quart of milk? One quart of milk is about equal in food value to any one of the following:



1 quart of milk costing 8 or 10 cts.

8 eggs costing 25 to 30 cts.

FIG. 36.

- 2 pounds of salt codfish.
- 3 pounds of fresh codfish.
- 2 pounds of chicken.
- 4 pounds of beets.
- 5 pounds of turnips.
- 1/6 pound of butter.
- 1/3 pound of wheat flour.
- 1/3 pound of cheese.
- 3/4 pound of lean round beef.
- 8 eggs.
- 2 pounds of potatoes.
- 6 pounds of spinach.
- 7 pounds of lettuce.
- 4 pounds of cabbage.

What is the food value of a glass of milk?

A glass of milk is about equal to

- | | |
|-----------------------------------|---|
| A glass of milk is about equal to | <ul style="list-style-type: none"> 2 large eggs, a large serving of lean meat, 2 moderate-sized potatoes, 5 tablespoonfuls of cooked cereal, 3 tablespoonfuls of boiled rice, or 2 slices of bread. |
|-----------------------------------|---|

School credit for home work. Beginning with the hot lunch as a center, the practical work in domestic science may be extended gradually to the home. Children may be required to do certain things at home. Dishes may be prepared at home and brought to the school for lunch. This method of teaching has become quite popular in many sections of the country, and if properly conducted has much value, not only in educating the pupil, but also in bringing the home and school into closer sympathy and materially affecting the dietetic habits of the home.

One teacher who tried this method thus briefly describes her plan and the results:¹

¹ W. T. Hodges. *Important Features in Rural School Improvement*. United States Bureau of Education, Bulletin No. 599, pp. 45, 46.

Lists of the things for which credit would be given, including habits of neatness and cleanliness, were printed and copies given to the pupils. Notebooks were furnished and daily records kept of the amount and kind of work done in the home. These records were signed by the parents and from time to time shown to the teacher. A lively interest was soon aroused, and home and school were brought into a closer relation.

At a little social gathering a cake that was served was pronounced very fine. A mother proudly asserted that her daughter had made it. "She does nearly all the baking in the home since the home industrial plan was started," she added.

Recipes for school lunches. Before introducing hot lunches in the rural school, the teacher should have at hand some good recipes of suitable dishes which can be prepared with ease for growing children. Soups, stews, custards, and chowders are especially acceptable for the midday meal. Teachers will find some excellent suggestions and a number of recipes in Farmers' Bulletin No. 712, *School Lunches*. This is a free bulletin. Normal schools, State agricultural colleges, and State departments of education are also beginning to issue pamphlets on lunches in the rural schools. Usually these are available only in the States where they are authorized for publication. In preparing this chapter the author has found the following bulletins particularly helpful:

Milam, Turley, and Cowgill. *The School Luncheon*. Oregon Agricultural College, Bulletin No. 222.

Lunches for the Rural School. University of Nebraska College of Agriculture, Extension Bulletin No. 32.

Frances L. Brown. *Home Economics in Village and Rural Schools*. Kansas State Agricultural College.

With the permission of the Kansas State Agricultural College the recipes given in the bulletin written by Frances L. Brown are reproduced. As a result of much experience they have been proved to be especially good for the rural school:

WHAT TO SERVE

To serve ten

All measurements are level: Tsp. means teaspoon; tbsp. means tablespoon; c. means cup (1/2 pint).

Cocoa

6 tsp. cocoa.	3 qts. milk.
4 1/2 tsp. sugar.	1 c. water.

Bring water to a boil, mix cocoa and sugar, and pour on boiling water, cooking until smooth and glossy. Scald the milk and add it to the cocoa just before serving. (This allows one cup per pupil and a little over.) The preparation had best begin at 11.30 A.M. to be ready at 12.

Chocolate

6 squares Baker's chocolate.	4 c. boiling water.
1 c. sugar.	1/2 c. milk.
Few grains salt.	

Scald milk. Melt chocolate in saucepan placed over hot water, add sugar, salt and gradually boiling water; when smooth place on a range and boil one minute; add to scalded milk and serve in chocolate cups, with or without whipped cream. One and one half ounces vanilla chocolate may be substituted for Baker's chocolate; being sweetened, less sugar is required. This allows a little over one cup each, and should be begun at 11.30 A.M.

Potato soup

1 qt. peeled potatoes, cut in thin slices.	4 tbsp. flour.
	1/8 tsp. black pepper.
4 qts. milk.	A small onion.
2 tsp. salt.	1/2 tsp. celery seed or a stalk of celery.
4 tbsp. butter.	

The potatoes should be peeled and put into cold water before school, also cream together the flour and butter, with the seasonings except the onion. At eleven o'clock the water for the potatoes should be made to boil. When boiling, pour it upon the sliced potatoes and cook them until tender. Drain off the water, scald the milk and pour it upon the mixture of flour and butter. Stir until smooth. Return to the fire and add the potatoes, and cook until

flour is cooked and potatoes soften down, but do not allow the soup to boil. It is better to keep it just simmering.

Corn chowder

1 pt. potatoes, peeled and dried.	1 onion.
1 pt. can corn.	4 qts. milk.
3 slices of bacon or salt pork.	1 tsp. salt. 1/4 tsp. pepper. 2 tbsp. butter.

At ten o'clock put water on to boil, dice the potatoes that were peeled before school, and put them to cook with the boiling water. Boil them five minutes and drain. Cut the bacon up into tiny bits and fry it out, add the onion and brown it, but do not let it burn. When the onion is browned, empty the bacon, together with the onion and fat, into the kettle with the potatoes, add the corn and other seasonings. Pour upon this two quarts of water, and simmer it all forenoon, until 11.45, then scald the milk and add it and the butter to the chowder just before serving.

Emergency soup

1 qt. can tomatoes.	1/2 tsp. pepper.
2 c. water.	1 tsp. celery seed or salt.
6 tbsp. butter.	1 tsp. salt.
1/2 c. flour.	6 cloves.

Mix all ingredients except flour and butter together and cook fifteen minutes, stirring occasionally to prevent sticking. Rub flour and butter together. Strain tomato mixture and pour it upon the flour mixture. Return to fire and let boil gently. Serve hot. Begin work at eleven o'clock.

Cream of tomato soup

1 qt. can tomatoes.	1 onion.
4 tsp. sugar.	1/4 c. flour.
1/2 tsp. soda.	1 tsp. salt.
2 qts. milk.	1/2 tsp. pepper.

Scald milk with onion, remove onion and thicken milk with flour mixed and diluted with cold water until it is thin enough to pour, being careful that the mixture is smooth; cook twenty minutes, stirring constantly at first. Cook tomatoes with sugar fifteen minutes, add soda; combine the mixtures, add the butter, salt and pepper, and serve. Begin work at eleven o'clock.

White sauce for scalloped dishes

1 c. milk.	2 tbsp. butter.
2 tbsp. flour.	1/4 tsp. salt.

Scald the milk; rub flour, butter and salt together; pour upon it the hot milk, and return to the fire to cook, stirring constantly to prevent burning. It is safest always to cook it in a double boiler or over hot water.

Any vegetable may be boiled and drained and scalloped by the following method:

Butter a pan or bowl, and put in the bottom of it a layer of the boiled vegetable (onions, cabbage, cauliflower, potatoes, tomatoes). Over this pour a layer of the white sauce, then another layer of the vegetable, and so on, finishing with the sauce. Such dishes are improved by covering with buttered crumbs. These are made by mixing together three times as many crumbs as butter used. To serve ten there should be two quarts of the vegetable and two quarts of white sauce, with two cups of buttered crumbs. Grated cheese may be added as well if desired. The dish should then be put into the oven and cooked until the sauce bubbles up through the crumbs and the top is brown. Begin work at ten o'clock.

Macaroni and cheese.

3 c. macaroni broken in two-inch pieces.
3 qts. boiling water.
3 tsp. salt.
6 c. white sauce (made as above).

Cook macaroni in boiling salted water until tender. Drain, pour cold water over it; drain it once more and add it to the white sauce. Sprinkle a layer of grated cheese upon each layer of macaroni and also at the top. Bake as for any other scalloped dish. To give variety, finely minced ham, boiled codfish or other cold meat may be used instead of cheese.

Rice and raisins

3/4 c. rice.	1 c. raisins.
2 qts. boiling water.	3/4 tsp. salt.

Wash the rice and the raisins, pour the boiling water upon the rice and cook rapidly for five minutes, stirring constantly. Add the raisins, and simmer for one hour. Serve hot, with sugar and cream.

Rice pudding

2 c. rice.	4 qts. milk.
1 c. raisins.	1 c. sugar.
1 tsp. salt.	1 tsp. cinnamon.

Wash rice and raisins, and put all together in a buttered milk pan and bake all forenoon. Stir it occasionally during the first hour. Serve with cream or milk.

On particularly cold days it might be possible to bake potatoes as well as to prepare the regular hot dish. Many other dishes will naturally be suggested by children or parents, depending upon things grown and upon the tastes of the children and parents.

Helpful bulletins and books. It would be advisable for every teacher to take a course in domestic science, possibly in some summer school, if she has never had any training in this field; but that is not absolutely necessary if she is willing to study and learn. The first thing to do is to collect a library of the best Government bulletins on foods and, if possible, one or two good books. If the teacher has never had any experience in cooking, it would be profitable for her to learn to cook some of the dishes that she would like to have prepared for school lunches. If she does this she will be saved much embarrassment in beginning her undertaking. Many of the best pamphlets may be secured free, and every teacher ought to be able to own one or two good books. Probably the school board could be persuaded to buy others.

The following Government pamphlets will be found serviceable:

*Available for free distribution by the United States Department of Agriculture,
Washington, D.C.*

Meats: Composition and Cooking. Farmers' Bulletin 34.

Beans, Peas and Other Legumes as Food. Farmers' Bulletin 121.

Canned Fruit, Preserves, and Jellies: Household Methods of Preparation.

Farmers' Bulletin 203.

Cereal Breakfast Foods. Farmers' Bulletin 249.

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- Preparation of Vegetables for the Table.* Farmers' Bulletin 256.
Use of Fruit as Food. Farmers' Bulletin 293.
Food Value of Corn and Corn Products. Farmers' Bulletin 298.
The Use of Milk as Food. Farmers' Bulletin 363.
Care of Food in the Home. Farmers' Bulletin 375.
Economical Use of Meat in the Home. Farmers' Bulletin 391.
The Care of Milk and Its Use in the Home. Farmers' Bulletin 413.
Mutton and Its Value in the Diet. Farmers' Bulletin 526.
Sugar and Its Value as Food. Farmers' Bulletin 535.
Use of Corn, Kafir, and Cowpeas in the Home. Farmers' Bulletin 559.
Corn Meal as a Food and Ways of Using It. Farmers' Bulletin 565.
Honey and Its Uses in the Home. Farmers' Bulletin 653.
School Lunches. Farmers' Bulletin 712.
Food for Young Children. Farmers' Bulletin 717.
Homemade Fireless Cookers and Their Use. Farmers' Bulletin 771.

*For sale by the Superintendent of Documents, Government Printing Office,
Washington, D.C.*

- Principles of Nutrition and Nutritive Value of Food.* Farmers' Bulletin 142.
Price, 5 cents.
Bread and Bread-Making. Farmers' Bulletin 389. Price, 5 cents.
The Chemical Composition of American Food Materials. Office of Experiment Stations, Bulletin 28. Price, 10 cents.
Iron in Food and Its Functions in Nutrition. Office of Experiment Stations, Bulletin 185. Price, 10 cents.
Calcium, Magnesium, and Phosphorus in Food and Nutrition. Office of Experiment Stations, Bulletin 227. Price, 10 cents.
Composition of Food Materials. Office of Experiment Stations, Food and Diet Charts 15. Price per set, \$1.
The Food Value and Uses of Poultry. Department Bulletin 467. Price, 5 cents.
Potatoes, Sweet Potatoes, and Other Starchy Roots as Food. Department Bulletin 468. Price, 5 cents.
Fats and Their Economical Use in the Home. Department Bulletin 469. Price, 5 cents.
Eggs and Their Value as Food. Department Bulletin 471. Price, 5 cents.

Some Good Books.

- Conley. *Principles of Cooking.* American Book Company, New York.
For general reference.
- Kinne and Cooley. *Food and Household Management.* The Macmillan Company, New York.
Excellent for general reference.

Kinne and Cooley. *Food and Health*. Macmillan, New York.

Excellent textbook for children. Has 60 pages on school luncheon.

Mary J. Lincoln. *The School Kitchen Textbook*. Little, Brown & Co., Boston.

This will be especially valuable for teachers who wish to give school credit for home work in household economics, a desirable book to put into the hands of the pupils.

Josephine Morris. *Household Science and Arts*. American Book Company, New York.

One of the very best books on the market. If pupils or school board could be induced to purchase a few copies they could be used to great advantage.

How one teacher introduced hot lunches. Many teachers who have some hesitation about the desirability or possibility of serving a hot lunch at midday will be interested in the story of how one teacher began this practice and how she regarded her results. She writes:¹

I have been serving the hot lunch to my children since January 1 and feel that no little of my success has been due to getting hold of the children and parents through this line of work.

We have no kitchen here, but we improvised one in one end of my cloakroom by putting in some shelves and covering with oil-cloth and having curtains to cover them. One of my good patrons gave us a nice little table, which we use for dining upon, and though it is small, we enjoy sitting around it together.

We bought two dishpans, one large cooking kettle, a paring pan and knife, a long-handled spoon, one dozen spoons, a half dozen plates, a dozen cups and saucers and a few other little fixtures. The children brought what other things we needed and we began. Of course, we have no stove, but our heater has a large, flat top and we use it for heating our water and doing our cooking.

I usually assign the work to one of the eighth-grade girls, who has as her helper one of the small boys. We find it takes little or none of our time as I place the plan on the board and all copy it into their notebooks and we sometimes discuss it with the whole school, using it as the topic for language work. I find so far that it has afforded the following advantages to my school:

¹ Letters from Parents and Teachers. Hot Noon Lunch and Social Center Work, State Normal School, Cheney, Washington.

1. More useful, busy work for the little ones.
2. Language work for the entire school.
3. Opportunity for teaching table manners.
4. Practical lessons for domestic science.
5. An orderly noon hour.
6. A better lunch pail from home.
7. More interest on the part of patrons in our school.
8. A more palatable dinner for all of us.

Another teacher writes:

We gave a social and raised a little money and with it I bought a good two-burner oil stove, a dishpan, a large soup kettle, a tea kettle, a soup ladle, a dozen spoons and two and one-half yards of white oilcloth for desk covers and some salt and other stock materials at a total cost of \$11.30. I then made out a list of material the children could bring to make the hot lunch for each day. All responded readily and we began. We have soup four days and on Fridays we have a cup of cocoa. The children like it very much and we would not think of going back to the old plan of the cold lunch.

I start the fire about eleven o'clock and two of the girls quickly make the soup and put it on and it is all ready by twelve o'clock. One child acts as waiter and another with the ladle dips out the soup while the others quietly wait at their desks to be served.

After dinner each child carries his soiled dish to the wash table and two of the children wash and put away the dishes. There is no trouble whatever in getting the work done. The children really enjoy it and it takes no time from the regular work. Lately one of the neighbor girls not attending school came to visit us, and, much to our surprise and delight, at noon hour surprised us with a fine chicken dinner she had brought with her all ready to serve. There was some objection to the hot lunch at first on the part of some parents, but they have been reasonable about it and I think now all are supporting it well. I am sure the people as a whole in the district feel it has been a fine thing and are glad to support it in every way.

A parent's opinion of the hot lunch. The domestic science work in connection with the hot lunch will not be successful unless it secures the coöperation of the parents. The follow-

ing extracts from a parent's letter shows how the work of the school penetrated the home:

I am sure the physical condition of the children is better, especially those children who have a long way to come and have to eat breakfast so early in the morning that they will not take enough nourishment to do them with a cold lunch. The lessons which the careful teacher gives to the children in the way of table manners and proper eating are well worth the time and expense of the hot lunch. The parents also know so much better what to put up in the way of a lunch since they know it will be supplemented by some hot dish at school. The children all have to spread their home lunch on the desk before the other children, and it has made them and their mothers more careful about putting up neat and well-arranged lunches since they know the plan of all eating together.

We feel the hot lunch has bound us all more closely together. The homes know more of each other and parents and teacher know each other so much better.

We often hear this remark: "How did we ever get along for so many years without our little school kitchen and the hot lunch for our children?"

Opportunity for the inculcation of health habits. If the hygiene of digestion and home economics are properly taught, the pupils will have not merely theoretical knowledge; they will also have acquired habits conducive to health. Let us consider a few of these briefly:

- (1) Skill in making out menus so that there may be a balanced ration.
- (2) Hygienic and sanitary preparation and cooking of food.
- (3) Proper care of ice chest and cupboard-cleanliness, screening from flies, protection from mice, ants, etc.
- (4) Washing dishes correctly. Teachers should emphasize the necessity of rinsing all dishes in boiling hot water.

- (5) Cleanliness of linen, towels, dish cloths, aprons, etc. Most children if properly encouraged by the teacher will enjoy and take pride in keeping everything neat and clean.
- (6) *Safe disposal of garbage.* One of the best ways of disposing of inedible incombustible garbage is to bury it deep enough so that it will not be disturbed by dogs or by cultivation.
- (7) Washing the hands before eating. This is one of the most important of health habits. Teachers should insist on its being carried out.
- (8) Proper use of individual napkin.
- (9) Correct mastication of food. Lunch should be prepared early enough so that the children will feel a sense of leisure when eating.
- (10) Cheerfulness at mealtime.

In addition to these habits there are others not so directly related to health, and yet of incalculable worth, which need to be cultivated. For example, there are habits of economy and politeness (table manners).

The teacher has an opportunity to supervise directly these habits. If she secures the coöperation of the parents, she will also be able to accomplish much in getting them established as home habits.

CLASS EXERCISES

1. Compare chapters on food and digestion in three different textbooks on hygiene for children. Which book would you prefer to put into the hands of children? Why?
2. Ask some teacher in a rural school to have her pupils write a composition on what they brought from home for lunch. How many of the lunches were suitable for children? Suggest what might be added to several of the undesirable lunches so that the ration would be suitable?
3. Visit some rural school where hot lunches are served at noon. What did the equipment cost? What was the value of this lunch?

4. Can you suggest other menus for midday lunches besides those mentioned on pp. 280-283?
5. Make a collection of pamphlets on food. Add to the list of references given on pp. 283-284.
6. Plan a series of lessons on foods such as you would present to older children in a rural school. How would these lessons differ from similar lessons for little children?

CHAPTER XVI

THE CARE OF THE EYE AND EAR

Children who have defective eyes, ears, noses, and throats cannot, unless relieved, receive and profit by public-school education. To such children, school work is a pain and a burden.

(Dr. Frank Allport.)

THE normal functioning of the eye and ear is of fundamental importance because these sense organs are the chief avenues through which we learn about the world around us, and also because any defect in these organs is apt to be accompanied by conditions having a far-reaching effect on the general health.

How we see. As is well known, the eye is similar in its function to a camera. Like the camera, there is an aperture to admit the rays of light and there is a lens which brings the rays of light to a focus on a sensitive surface — the retina in case

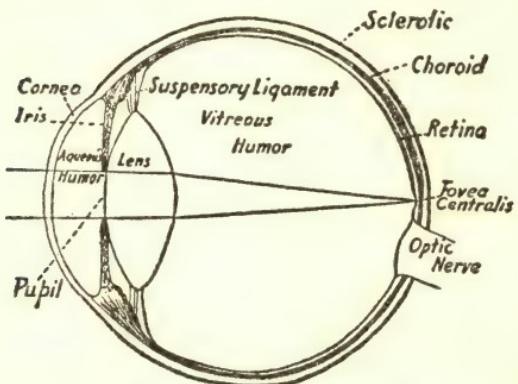


FIG. 37. DIAGRAM SHOWING A SECTION THROUGH THE EYEBALL

(From Conn and Buddington's *Advanced Physiology and Hygiene*, with the permission of Silver, Burdett & Co.)

of the eye, and the plate or film in the case of the camera. (See Fig. 37.) There is one very marked difference, however. If the rays of light are not brought to a focus on the sensitive plate or film, if the image is not clear, we may focus the camera by varying the distance between the lens and the plate or film. This method is impossible

in the function of the eye. If there is a confused image on the retina, the lens itself must be changed so as to be more or less convex until a clear image is obtained.

If the eye is normal, parallel rays of light (rays coming from an object twenty feet or more away) will be readily brought to a focus without any change occurring in the shape of the lens. (See Fig. 38.) Under such conditions the lens is comparatively flat because the choroid coat of the eye, which is attached to the lens by means of ligaments,

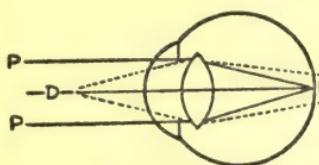


FIG. 38. THE NORMAL EYE IN A STATE OF REST

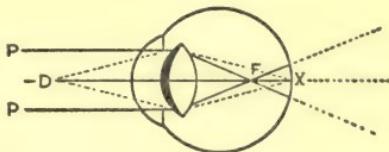


FIG. 39. THE NORMAL EYE FOCUSED ON AN OBJECT NEAR AT HAND

Notice the increased convexity of the lens.

(From Hiram Woods' *Eye-Strain*, with the permission of the American Medical Association.)

pulls the lens out so that it tends to become flat. But when the object is near at hand, the lens, if it still remained flat, would not bring the rays of light to a focus. A very ingenious kind of mechanism now effects a change in the shape of the lens so that clear vision results. A little muscle called the "ciliary muscle" has one end attached to the choroid coat and the other to the outer coat of the eye, to the sclerotic. When this little muscle contracts it draws the choroid coat forward and the lens, which is quite elastic, assumes its independent or more convex shape. (See Fig. 39.) It will be noticed that the normal eye is at rest when a distant object is observed, and that the ciliary muscle, often called the "muscle of accommodation," is exercised only when an object is near at hand. A complete act of seeing also involves brain activity which it is unnecessary to discuss here.

Defects of the eye, and eye-strain. There are several

structural defects of the eye which are apt to reduce the acuity of vision and also to bring about serious conditions of eye-strain.

The length of the eyeball is exceedingly important. The normal eye has a ball which is of such a length that the parallel rays of light are brought to a focus on the retina

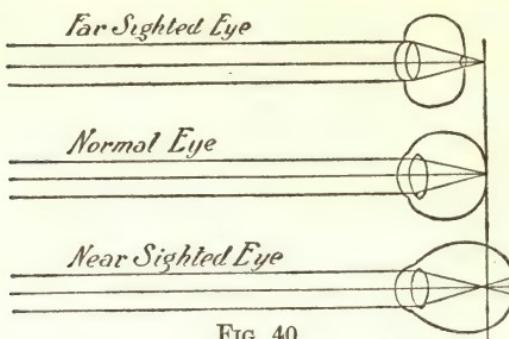


FIG. 40.

without the aid of the muscles of accommodation. The far-sighted eye is so short that when the eye is at rest the parallel rays of light would be brought to a focus back of the retina (see Fig.

40). Under such conditions there would be a confused image on the retina if the ciliary muscle did not come into play and effect a greater convexity of the lens. When the proper adjustment of the lens can be made and maintained, the individual can see just as well as one having normal vision; but there is this very important difference: the person with normal eyes uses his muscles of accommodation only when he is looking at something near at hand, the far-sighted eye uses its ciliary muscles at all times and so is under an abnormal strain. If the eyeball is so short that accommodation is impossible for near objects, there is a lessened visual acuity for near objects.

The near-sighted eye (Fig. 40) is so long from front to back that parallel rays of light come to a focus in front of the retina. Since the lens at rest has no further power to reduce its convexity the eye cannot accommodate itself to distant objects. There is a lessened visual acuity, but the near-sighted eye is not usually subject to strain unless other

complications are involved. However, the near-sighted child often has a tendency to hold the book close to the eyes. A strain is thus brought to bear on the muscles which causes the eyes to converge. This can be demonstrated somewhat by trying to look at the end of your nose or by reading print held very close to the eyes. Such a simple experiment shows how serious would be the strain if one were compelled to use the eyes in this way in ordinary reading. It is often believed by those who are near-sighted that they do not need glasses because they can read so well. This is, of course, an absurd statement. Aside from the question of health, myopia, or near-sightedness, needs to be corrected if the child is to get the best results from school work.

Either a near-sighted or a far-sighted eye may have an irregularity known as "astigmatism," or this error may exist alone. Such a defect is due to an irregularity in the shape of the lens or cornea of the eye so that some of the rays are not focused naturally on the retina. Just as the far-sighted eye can by accommodation secure good vision, so the result of the irregularity of the front of the eye may be overcome frequently by an unequal contraction of the lens. If astigmatism exists and it can be overcome by such an adaptation, the eye is under a strain all the time it is in use. If this adaptation cannot be made, the visual acuity is lessened. A test for astigmatism is usually included with every Snellen vision chart.

Eye-strain may also be due to a lack of balance in the muscles which turn the eyes. Each eye has a separate picture, and unless the two eyes are turned so that the image falls on the corresponding parts of the retinæ double vision will result. This confusion is, of course, very unpleasant. If there is any tendency of the eyes to turn in the wrong direction an excessive amount of energy must be utilized to "whip" them into line. This not only involves a serious

waste of energy, but makes the individual conscious of the excessive effort needed to direct the attention to any one object for a certain length of time. The result is disastrous to the concentration of the attention and the economy of energy.

Effect of eye-strain on school work. It is a popular but erroneous belief that if one can see clearly one's eyes are in good condition. Such a belief, as we have shown in the previous pages, is now exploded, for one may have good vision and yet suffer exceedingly from eye-strain. If a child can see distinctly, but is obliged to use much of his energy and effort to see, it is easy to conclude that he has a tremendous handicap; for the energy which is used to see cannot then be utilized in school work. Not only this, but the strain leads to a congestion and inflammation of the eyes and lids, thereby not only often reducing visual acuity, but even affecting such remote parts of the body as the stomach, neck, and back. A child with a serious eye-strain, especially after entering school, when the eyes must be used a good deal, is likely to be backward and to suffer from headaches, indigestion, nervousness, and many other maladies.

A good idea of the serious effect of eye-strain on the general health and school work may be had by reading the following cases reported by reliable physicians:¹

Case 5. Boy, age eleven years. Surroundings good, but he was so dull in school that he had fallen three years behind. Examination revealed mixed astigmatism. When this was corrected he began to improve physically, and two years later he had overtaken his former classmates.

Case 3. Girl, age sixteen years. She was behind in her class and complained of headaches and of becoming sleepy while reading. About this time she exhibited an aversion to studying and to practicing on the piano. This was inexplicable to her mother, as the girl had always been very studious, and only the year before had

¹ From Swift's *Mind in the Making*.

won class honors. An acute catarrhal inflammation of the eyes brought her to the oculist, who found that she had hypermetropic astigmatism. The proper correction brought complete relief and all the disturbing symptoms vanished.

Case 5. Girl, age fifteen years. Five weeks before the physician was consulted she had fallen in a convulsion while in school. During the attack she was unconscious and foamed at the mouth. "The aura consisted of pain in the head, dizziness, and blackness of vision, and after this she passed into a general tonic spasm, which lasted for five minutes." These attacks followed continued use of her eyes, and they occurred either in school or shortly after. She was nervous and suffered from almost constant headache. Examination of her eyes showed compound hypermetropic astigmatism. Glasses were prescribed, and so long as she wore them she had no attacks, but on one occasion, when they had been mislaid, she had four convulsive seizures. After they were found and again worn the attacks once more ceased and had not returned up to the time when the case was reported.

Defective vision and school work. Children who have defective vision are at a serious disadvantage in learning. The near-sighted child may progress normally in the use of books, but he is apt to find it difficult to read the words on the blackboard. Often children have this defect without either they or the teacher being aware of it. The child knows that he cannot see what is written on the blackboard from the opposite side of the room, but frequently he does not know that he is different in that respect from the other pupils. If he is called upon to copy from the board, and he cannot see the material clearly, he is likely to make many errors. The teacher, not understanding the trouble, is apt to blame it to stupidity or willfulness and so treat the child unjustly. On field trips the near-sighted child is particularly at a disadvantage, as the distant and larger features of nature cannot be discerned. Dr. Burnham tells in one of his lectures about a boy who, after being fitted with glasses, was astonished to see birds. Before this he had thought that birds were to be heard, but not to be seen.

The far-sighted child excels in those things in which the near-sighted child is weakest. Even if he is seated some distance from the blackboard, he may read what is written, and on field trips he is able to see certain things that are hidden from the near-sighted child. But in those things that the school usually believes to be most important, namely, reading books, he is apt to be very backward. The far-sighted pupil whose eyes are exceedingly defective is so unable to do near work that necessity will sometimes compel parents to get medical advice. This is not the type of pupil that suffers usually in the school; it is the boy or the girl who is able to see, but with tremendous effort. After a few minutes of continuous study the lines on the page may begin to dance and the child may feel tired and nervous. From that time on the attention is apt to be given intermittently to study, and since children must do something, they are quite likely to be disorderly and the lessons are not learned. Many statistics are available to show that such a handicap is responsible for a good deal of truancy, juvenile delinquency, and poor scholarship.

Testing the eyes. Wherever medical inspection of schools has been established, the eyes of the children have been tested to discover defects. The testing is such a simple matter that usually the teacher is instructed to carry out these tests. After defects which need correction have been discovered, parents are usually informed and asked to take the children to a physician or an oculist. Since most of the readers of this book will not be teaching in a school subject to medical inspection, the teacher will, in most cases, not be able to get the advice of a physician in connection with any tests she may make, and there will be almost nothing helpful in the way of precedent to get defects corrected. Nevertheless, the teacher should make these tests. Even if she cannot persuade parents to help solve the problem,

E W 200

B P E 100

T E Z M 70

D P M L E 50

L F E P C W 40

C W L E T F M 30

P M T F E O W D E 20

FIG. 41. SNELLEN'S VISION CHART FOR SCHOOLS

(Reduced in size.)

(Reproduced from Dr. Frank Allport's "School-Children's Eyes" with the permission of the American Medical Association.

she can at least get some knowledge of the condition of the children's eyes so that she will not expect the impossible from those with defective vision. She may also be able to do something in connection with the regular work of the school to alleviate conditions, if it is nothing more than to move the seat of a near-sighted boy nearer to the board or to give the far-sighted boy more work which does not require the constant excessive strain to the eyes.

Dr. Frank Allport, of the American Medical Association, has prepared a visual chart for schools which any teacher may use without difficulty.¹ The complete chart may be purchased from C. F. Hardy, New York and Chicago, for twenty-five cents.²

The instructions for the examination of children's eyes are as follows:

Do not expose the card except when in use, as familiarity with its face leads children to learn the letters "by heart."

First-grade children need not be examined.

The examination should be made privately and singly.

Children already wearing glasses should be tested with such glasses properly adjusted on the face.

Place the "Vision Chart for Schools" on the wall in a good light; do not allow the face of the card to be covered with glass.

The line marked 20 should be seen at twenty feet, therefore place the pupil twenty feet from the card.

Each eye should be examined separately.

Hold a card over one eye while the other is being examined. Do not press on the covered eye, as the pressure might induce an incorrect examination.

Have the pupil begin at the top of the test-card and read aloud down as far as he can, first with one eye and then with the other.

For the use of those children not knowing the names of letters,

¹ Read Frank Allport, M.D. *School-Children's Eyes*. Conservation of Vision Series, Pamphlet 1. American Medical Association, Chicago.

² The ordinary Snellen chart may usually be secured free by writing to the State Superintendent of Schools.

the sign (w) has been placed on each line in various positions. The child should indicate in which position this sign is placed. A cardboard symbol (w) can be easily cut out, which the child can hold in its hand. It should hold the figure in the same position as the one it is expected to see on the chart. For the purpose of convenience each line ends with the sign (w) in various positions.

If a pupil fails to read a majority of the letters in the number 20 line of the test types with either eye, it is an indication that the eyesight is defective so that an oculist should be consulted.

Such a test as has been outlined will usually reveal short-sightedness, but it is difficult to determine far-sightedness because many children are naturally far-sighted, although they can see clearly for the time of the test by an active power of accommodation. Often a case of far-sightedness is regarded as a case of short-sightedness, because the pupil is unable to make out the letters of the lowest line at the distance indicated. Far-sightedness is usually indicated by redness of the eyes, watery appearance, and headaches after protracted and close use of the eyes. Although the teacher should naturally be interested to find out the general character of the eye defect, so as to relieve strain and improve school work, she should studiously refrain from making a diagnosis for parents, because only an expert is competent to do that. If she makes the test carefully and observes the pupil at work she will be competent to say, however, that something is wrong with the pupil's eyes and that an oculist ought to be consulted.

The detection of eye-strain. It will be noticed that the mere use of this chart itself only assists in determining whether the pupil examined has a low visual acuity. Such a test may not detect many of those suffering from eye-strain, for, as we have already pointed out, the *ability to see does not mean that one's eyes are perfect, since clear vision may result from an unusual expenditure of energy.* There are

other means, however, of discovering these unfortunate conditions. If the child works well at his books for a short time and then becomes restless, if he scowls or frowns when reading, if his eyes seem inflamed and he complains of frequent headaches, the teacher may be very suspicious that eye-strain is present.

If the teacher gains the confidence of her district and can have a subject like the care of the eyes discussed at one of the parent-teacher association meetings she may be able to follow up pupils who need help and get parents to consult an oculist.

Training children to care for their eyes. Every teacher who discovers children with defective vision will, as has been suggested, be able to treat them with much more sympathy and understanding. But besides trying to make the conditions for eye-work much more satisfactory for them in the schoolroom, such children, along with all normal children, need to be trained to use their eyes properly.

A committee of the National Education Association has recommended the following rules for the preservation of eyesight:

Take care of your eyesight; upon it depends much of your safety and success in life.

Always hold your head up when you read.

Hold your book 14 inches from your face.

Be sure that the light is clear and good.

Never read in the twilight, in a moving car, or in a reclining position.

Never read with the sun shining directly on the book.

Never face the light in reading.

Let the light come from behind or over your left shoulder.

Avoid books or papers printed indistinctly or in small type.

Rest your eyes frequently by looking away from the book.

Cleanse the eyes night and morning with pure water.

Never rub your eyes with your hands or an unclean towel, handkerchief or cloth.

Rules like these should be thoroughly discussed in class, and then an effort should be made to put them into practice. Some of them may be carried out in the schoolroom under the watchful eye of the teacher. Some of them are home habits. It would be interesting in the case of these to have them dramatized (see p. 48) and to get children to report to the class on successes and failures. Some of these reports might readily be incorporated in the health record. (See pp. 51-55.)

While the teacher can usually do little in the way of remodeling a schoolroom so that it will be more hygienic for the eyes, sometimes she may do something to better conditions. If new shades are to be bought, she may recommend not the usual dark green shades which are opaque but those tan in color and translucent. Such shades cut off the blinding rays of the sun but allow enough light to shine through to keep the room well illuminated. The Draper window shade (manufactured by the Draper Shade Co., Spiceland, Indiana) is one of the most adjustable. All children should be given the opportunity and responsibility of adjusting the shades.

Popular articles on the conservation of vision. Teachers who wish to get more information about the eye than is furnished in this chapter, or in the text or reference books at hand, will be interested to know that the American Medical Association, 535 North Dearborn Street, Chicago, has prepared under the direction of experts a series of pamphlets on the conservation of vision. They have been prepared especially for the ordinary reader. Many of them would be useful and illuminating to teachers. The regular price of these pamphlets is five cents each. A reduction is allowed if ten or more are ordered. The following pamphlets are now ready:

- Pamphlet I: *School-Children's Eyes*, by Dr. Frank Allport, Chicago.
- Pamphlet II: *Industrial and Household Accidents to the Eye*, by Dr. Harold Gifford, Omaha.
- Pamphlet III: *Wearing Glasses*, by Dr. W. B. Lancaster, Boston.
- Pamphlet IV: *The Relation of Illumination to Visual Efficiency*, by Dr. Ellice M. Alger, New York.
- Pamphlet V: *Trachoma in Eastern Kentucky*, by Dr. J. A. Stucky, Lexington, Ky.
- Pamphlet VI: *Auto-Intoxication and the Eye*, by Dr. H. D. Bruns, New Orleans.
- Pamphlet VII: *Eye-Strain*, by Dr. Hiram Woods, Baltimore.
- Pamphlet VIII: *Lenses and Refraction*, by Dr. Frank Allport, Chicago.
- Pamphlet IX: *The Eye and Its Functions*, by Dr. Frank Allport, Chicago.
- Pamphlet X: *Care of the Eyes*, by Dr. Frank Allport, Chicago.
- Pamphlet XI: *Infant Blindness, or Ophthalmia Neonatorum*, by Dr. F. Park Lewis, Buffalo, New York.
- Pamphlet XII: *Ordinary Eye Diseases*, by Dr. L. W. Dean, Iowa City, Iowa.
- Pamphlet XIII: *Usual and Unusual Eye Accidents*, by Dr. E. C. Ellett, Memphis, Tennessee.
- Pamphlet XIV: *The Eyes of Transportation Employees*, by Dr. J. J. Carroll, Baltimore.
- Pamphlet XV: *Ocular Hygiene in Schools*, by Dr. S. D. Risley, Philadelphia.
- Pamphlet XVI: *Whiskey, Tobacco and Drugs and the Eye*, by Dr. Edward Jackson, Denver.
- Pamphlet XVII: *The Oculist and the Optician*, by Dr. Edward Jackson, Denver.
- Pamphlet XVIII: *Preparation for Blindness*, by Dr. F. Park Lewis, Buffalo.
- Pamphlet XIX: *What to Do for Blind Children*, by Dr. F. Park Lewis, Buffalo.
- Pamphlet XX: *Blindness from Wood Alcohol*, by Dr. Casey Wood, Chicago.
- This series is now ready; others will be added later.

The National Committee on the Prevention of Blindness, 130 East Twenty-second Street, New York City, also publishes a number of popular articles at nominal prices. Individual copies will be sent free to teachers on request.

The importance of good hearing in education. The discovery that many children in our public schools have defective hearing has thrown a flood of light on several perplex-

ing problems. As in the case of near- or far-sightedness, the child who is deaf frequently does not realize his condition. He does not hear the same words spoken by the teacher or the pupils that are heard by his classmates or other members of the school. Consequently he misunderstands what is said. He thinks, perhaps, that the teacher gives certain directions and acts accordingly only to discover to his astonishment, not only that he is apparently wrong, but also that his motives are misinterpreted. The teacher scolds him for something he cannot help. He becomes sensitive to being scolded or laughed at for failings for which he is not responsible. Often he loses faith in himself; he stops trying; he becomes inattentive and even disorderly. His handicap prevents him from getting a normal, healthy attitude toward his fellow beings and toward his school work. The removal of such a handicap often entirely makes over a boy or girl not only so far as progress in school is concerned, but also in appearance and attitude.

Deafness is responsible not only for poor work done in school; it is often also a symptom of serious import to the general health. It may indicate adenoids or a chronic inflammation of the throat and inner ear.

Testing the hearing. A simple method of testing the hearing is the whisper test. The pupil stands with his back toward the teacher at a distance of twenty feet. The teacher whispers several things which he is asked to put down on paper, or he is directed to do certain things like holding up his right hand, touching his head, etc. If care is taken so that no pupil sees what the other does, it is possible for the teacher to test a number of pupils at one time.

Another test is the watch test. The teacher holds an ordinary stop-watch three feet from the pupil on a level with his ear. The distance between the watch and the pupils is varied from time to time so that the teacher may find out

the least distance at which the pupil may hear distinctly. The stop-watch is better than an ordinary watch because it is a more accurate test. Often the pupil thinks he hears when he does not.

In addition to finding out whether the hearing is normal, according to Dr. Allport, answers to the following questions should be ascertained:

Does the pupil complain of earache in either ear?

Does matter (pus) or a foul odor proceed from either ear?

Is the pupil frequently subject to "colds in the head" and discharges from the nose and throat?

Is the pupil a habitual "mouth-breather"?

An affirmative answer to any of these questions Dr. Allport says should be sufficient to warn parents that something serious may be involved.

Deaf children are often so apt in reading the lips of those who are speaking that even parents themselves do not know that their children have defective hearing. If their attention is called to this matter tactfully by the teacher, it is probably the exceptional parent who would not consult a physician. If the deafness is irremediable, the teacher can do little but take special precautions, as in the seating of the child, to provide the most favorable conditions so that the child may hear.

REFERENCES FOR CLASS READING

F. B. Dresslar. *School Hygiene*, pp. 221-247.

Hough and Sedgwick. *The Human Mechanism*, pp. 246-261, 395-492.

W. L. Pyle. *Personal Hygiene*, pp. 169-274.

L. M. Terman. *The Hygiene of the School Child*, chap. xiv.

CLASS EXERCISES

1. Dr. Terman estimates that from fifteen to thirty per cent of the children in our public schools have seriously defective vision. What do the investigations in your own State show?
2. What arguments would you present to induce a parent to take his child to an oculist?

3. Visit a rural school and notice the lighting. What defects do you notice? How might the teacher help to overcome these difficulties? Do the children seem to be using their eyes properly? Enumerate the bad habits noticed.
4. On a very dark day, when the use of the eyes in reading would be harmful, what change in a school program would you suggest?
5. Outline a talk which might be given to a parent-teacher association on what the school and home might do to conserve and improve the vision of the children.
6. Write out definite plans for a half-dozen consecutive lessons to children on the care of the eye. Indicate the age of the children.
7. Test the eyes of a member of your class according to the directions given on page 298.
8. Why do so many of the so-called children's diseases (measles, scarlet fever, mumps, etc.) lead frequently to discharging ears or even partial deafness?
9. Demonstrate by actual experiment upon various members of your class which of the two methods of testing audition described in the text is the preferable one.
10. Recall as many classrooms as possible in which you have studied. Were the conditions of lighting generally satisfactory or the reverse?

CHAPTER XVII

THE MEASUREMENT OF THE TEACHER'S WORK IN HYGIENE

There is a tremendous need of the gospel of school hygiene. Every person that preaches it is indeed a missionary. This gospel needs to go into many dark places, for there are hundreds of schools in which those in authority violate every known law of the proper housing and physical care of children.

(Superintendent Linnæus N. Hines.)

Ye see then how that by works a man is justified, and not by faith only.

James 2:24.

If the mere memorizing of subject-matter were the sole achievement of value in the health education of pupils, the measurement of the teacher's success by either herself or her superintendent would be an easy matter. But this book has failed in its purpose if it has not made perfectly clear to the reader that the *getting of information about health is of least importance and that the doing of things necessary for the getting and conserving of good health is the real standard of achievement.*

Why the measurement of health work is difficult. To give teachers and superintendents some basis for estimating the value of work done in health education, the author has attempted to formulate a plan for judging the teacher's results. This is, of course, a much more difficult matter than measuring results in penmanship, arithmetic, punctuation, or spelling, where the accomplishment is much more tangible. However, even a *crude* standard is better than none at all, and it is offered to teachers and educators with the hope that it may be useful and eventually lead to revision so as to become more just and accurate. It is often a difficult matter to estimate the worth of something accomplished. For example, the teacher may not cover a wide area in her instruction; yet she may do the children and community an

inestimable service by focusing her efforts on some pressing and exceedingly vital school or community problem.

Then, too, a teacher who initiates the kind of health education advocated in this volume may not be able to get many tangible results the first year; but she may do much to develop a sympathetic attitude on the part of pupils, parents, and community, so that the next teacher who pursues a similar policy and expends an equal amount of energy for the same length of time will get a larger return in specific results. The work of the first teacher has made possible much of the success of the second. But if the reader will bear in mind that the plan of measurement proposed here is known to be crude, he will not expect to measure achievements to a hair's breadth; he will see that an attempt at measurement, even in this way, may help by setting up a standard which teachers may be inspired to attain.

The number of points assigned to various phases of health education is a matter of judgment, and as the plan of measurement is used it ought to be so modified by experience as to be more useful. It should be noted, however, that while it is possible to make it more accurate, it may be so detailed and awkward in its application as to interfere seriously with its use. The writer has had in mind assigning a given number of points to particular results. On the basis of a certain number of these points the teacher's work might be graded *poor, good, or excellent*.

Health education is so complex in its nature and so dependent on time to obtain definite and permanent results that this scale ought probably to be applied at the end of a year's work, although if the teacher had it before her at the beginning of the year, she might be better able to plan her work, and also to determine whether she is doing those things necessary for a creditable rating. Incidentally the plan presented makes a good review of the most essential things in this book.

PLAN FOR RATING THE TEACHER'S WORK¹

<i>I. Assignment of time.</i>	<i>Score</i>
a. Five minutes per day for daily inspection of hands and teeth of entire school.	5
b. A minimum of fifteen to thirty minutes per week for instruction in first four grades.	1/2 point for every five minutes.
c. A minimum of thirty to sixty minutes per week for instruction in last four grades.	1/2 point for every ten minutes.
d. Prepared work in the last four grades equal to time assigned on the regular program for recitation.	1/2 point for every ten minutes required.
e. A minimum of fifteen minutes per day for supervised indoor physical exercise or out-door exercise if the weather permits.	1 point for every five minutes.
<i>II. Getting information.</i>	
a. In the last four grades children should read from one half to the whole of some regular school textbook.	2 points for 1/2. 4 points for whole.
b. Information should be organized so as to point to <i>action</i> as a method of solving problems.	3 points.
c. The consideration of at least a dozen practical problems in the course of a year.	1 point for every two problems up to twelve.
<i>III. Teacher's knowledge of the children's health.²</i>	
a. Number in school having defective teeth.	
b. Number in school having defective eyes.	
c. Number in school having defective hearing.	
d. Number in school subject to sore throat.	2 points for each.
e. Number in school subject to common colds.	
f. Number in school having bad habits of posture.	
g. Number in school breathing through the mouth.	

¹ The author would be pleased to hear from teachers and school superintendents who have tried to make use of this plan of measurement.

² See chap. IV.

IV. Clean teeth and clean hands.

- | | |
|---|---|
| <p>a. Percentage of pupils having clean teeth habitually, as shown by daily inspection.</p> <p>b. Percentage of pupils who acquire habits of keeping the teeth clean during the year.</p> <p>c. Percentage of pupils having clean hands habitually, as shown by daily inspection.</p> <p>d. Percentage of pupils who acquire habits of keeping the hands clean during the year.</p> | <p>1 point for every 10 per cent of pupils.¹</p> <p>3 points for every 10 per cent of pupils.</p> <p>1 point for every 10 per cent of pupils.</p> <p>3 points for every 10 per cent of pupils.</p> |
|---|---|

V. Habits of correct posture.²

- | | |
|---|---|
| <p>a. Percentage of pupils who are in correct sitting posture habitually at time of regular measurement.</p> <p>b. Percentage of pupils who have formed during the year habit of good sitting posture.</p> <p>c. Percentage of pupils passing the triple test at time of regular measurement.</p> <p>d. Percentage of pupils who have passed the triple test during the year.</p> | <p>2 points for every 10 per cent of pupils.</p> <p>6 points for every 10 per cent of pupils.</p> <p>2 points for every 10 per cent of pupils.</p> <p>6 points for every 10 per cent of pupils.</p> |
|---|---|

VI. Training in health habits.

(Clean hands, clean teeth, and good posture not to be counted.)

For list of habits see pp. 55-56.

1 point for every 10 per cent of pupils forming one health habit.

2 points for every 10 per cent forming two habits, etc.

¹ Any teacher is entitled to credit for not allowing the habits formed before she began work to lapse.

² See chap. XII.

VII. Making by children of devices and apparatus conducive to health.

- Fly-traps.
- Fly-swatters.
- Paper drinking-cups.
- Screening schoolhouse.
- Screening privies.
- Covers for privy-holes.
- Window-boards.
- Rat-traps.
- Drainage-trough for pump.
- Cupboard for domestic science.
- Table for domestic science.
- Piece of play apparatus for school-grounds.
- Model of ideal farm in sandbox.
- A fireless cooker.
- Etc.

1 point for every 10 per cent of pupils making any one device or piece of apparatus. If school project, add 5 points. If class project, add 2 points.

VIII. Health activities of children.

- Fly campaign.
- Killing rats.
- Oiling pools or puddles against mosquitoes.
- Keeping outhouses clean.
- Ditching school-yard.
- Field trips to study mosquitoes, see model dairy, etc.
- Earning money to further the health of the school.
- Training in heating and ventilating the schoolroom.
- School exercises on health day or for special health purposes.
- Learning to play at least six new games.
- Soliciting parents to contribute domestic science equipment.
- Preparing hot noon lunch.
- Keeping health records.
- Collecting emergency outfit.
- Etc.

1 point for every 10 per cent of pupils engaging in any one activity. If class project, add 2 points. If school project, add 5 points.

IX. Securing the coöperation of the community by the teacher.

- | | |
|---|--|
| a. Forming parent-teacher association and devoting at least one third of its meetings to health problems. | 8 points for forming association. 3 points for every health meeting. |
| b. Assisting in carrying on a parent-teacher association already formed and devoting some meetings to health problems. | 3 points for every health problem. |
| c. Getting association to contribute work or money to some health project of interest to the school. | 1 point for every dollar of value. |
| d. Securing either with or without the coöperation of the parent-teacher association an appropriation of money by the school authorities for health purposes. | 1 point for every dollar of value. |

X. Other activities of the teacher.

- | | |
|---|--|
| a. Adjusting school furniture twice a year. | 3 points. |
| b. Rural school field day. | 10 points. |
| c. Correction of defects, as farsightedness, etc., by persuading parents to consult physicians. | 10 points for every individual. |
| d. Reading one good book on health. | 3 points. |
| e. Getting bacteriological examination of drinking water. | 10 points. |
| f. Getting up school or community entertainment. | 1 point for every dollar of value invested in books or apparatus pertaining to health. |

CONCLUSION

Failure	45 points or less
Good	45 to 100 points
Excellent.....	above 100 points

Let us pass judgment on the work of several teachers according to a number of points.

The teacher who fails. The work of Teacher A is typical of the work of thousands throughout the United States. She has taught in her district for eight months. She has twenty pupils. At the beginning of the year, the general sanitary conditions were bad. The well had a wooden platform which was so rickety that slops from the children's drinking easily fell back into the well. The well was also less than a hundred feet from a filthy privy the contents of which were exposed to the flies. There was no play apparatus. The schoolroom was partially fitted with adjustable furniture. The children still drank from a common dipper and used a common towel if one was supplied. There was no thermometer to help regulate the temperature. The window shades were torn. There was no jacketed stove. No equipment for the preparation of midday lunches was available. The textbooks adopted by the school were somewhat antiquated.

What is accomplished in health education during the year?

Instruction in hygiene is confined to the last four grades. One hour per week is assigned for recitation and an equal amount of time for preparation. The children read the whole of one of the textbooks. Fully a dozen practical problems are considered, but the children recite almost *verbatim* from the books. No time is assigned for indoor physical exercise, and there is no inspection of hands and teeth. The children pass the written and oral tests proposed by the teacher with results quite satisfactory to the teacher, although no effort is made to train the children in hygiene.

At the close of the year there has been no change in the surroundings. The well is still uncared-for, the privy is more filthy than ever, the school furniture has not been adjusted, the common dipper is still in use, the window

shades remain unpatched, and no play apparatus has been provided. The teacher knows almost nothing about the health of the children. Those who had dirty teeth at the beginning of the year still have unclean mouths; those who were round-shouldered have not improved in posture. The community has not become interested in the slightest degree in health problems. The teacher has read no good book on hygiene. We might continue indefinitely to enumerate what the teacher did not accomplish. She has merely done what her predecessors had done for generations, and she has failed to do what they neglected. Although the teacher had possibly a good spirit and was willing to do anything that seemed to her to be worth doing, she has signally failed because she did not understand her opportunities. While the sincerity of her efforts might be well appreciated, her results are certainly pathetic.

Her score is computed thus:

1 hour per week for recitation in the upper grades	3 points
1 hour per week for outside preparation	3 " "
Whole textbook read	4 "
12 practical problems considered	6 "
Total	<u>16</u> "

Probably nobody would claim that this was passable work. It is easier to make this judgment than to determine just how many points are necessary for a passing grade.

Let us suppose that a teacher were to earn all the possible points suggested for minimum requirements under "Assignment of Time," "Getting Information," and the "Teacher's Knowledge of the Children's Health." She would win 44 points. Even then her work would not be passable, for it would have failed to secure important results in habit and action. Unless some noticeable change takes place in the lives of the pupils the results can scarcely be called educational. Let us say that any teacher who cannot earn more

than 45 points is not doing passable work in health education. Somebody may object to this by saying that particular combinations might be made showing that habits were formed and desirable action secured, without earning more than 45 points. In other words the elements under I, II, and III might be passed over lightly. It is possible, of course, for the teacher to do this and get some effective work done. However, as one studies the plan of measurement it is rather difficult to imagine a teacher doing much under IV, V, VI, VII, etc., without earning a considerable number of points under I, II, and III. While theoretically an achievement might be figured out with 45 points or less, which a group of educators might call passable work, the writer doubts that this would actually occur in practice.

The teacher who does good work. Probably nobody would disagree that earning more than 45 points would always mean some kind of worthy achievement in health education, for anything beyond the 45 points would necessitate actually doing something having positive health value. Let us estimate roughly that any teacher getting from 45 to 100 points is doing good work in health education. What may Teacher B accomplish so as to be judged an effective teacher of hygiene?

Teacher B has the same kind of school as Teacher A. Finding that the textbooks in hygiene were quite unsatisfactory, she recommended that a few up-to-date supplementary books be purchased. Six supplementary books were finally bought involving a cost of four dollars (4 points). All the points suggested under I, II, and III (44) were earned. By the end of the year fifty per cent of the pupils had clean hands (5) and clean teeth (5) habitually. Twenty-five per cent of these children had formed these habits (15) during the school-year. The schoolroom furniture was adjusted twice (3). The children all brought individual drink-

ing-cups from home and eighty per cent of the children used them habitually (8). The total number of points earned is 84. It is obvious that Teacher B is getting results. The children are being trained in matters of first importance to health.

The teacher who does excellent work. Teacher C in a similar school and under similar conditions not only does all that B has done (84 points), but much more. Under her leadership a parent-teacher association is formed and three meetings are devoted to health (17). The friendly coöperation of the parents is aroused to such an extent that one boy suffering from eye-strain is taken to an oculist on the recommendation of the teacher and the defect is corrected (10). Under her guidance a trough is made to catch the slops from the pump. The most advanced class, numbering five, or twenty per cent of the school, does this as a class project (4). This same class also makes a teeter-board (4). A vigorous campaign is made by the teacher to get the children to keep sanitary the privies, which had just been cleaned out. Ninety per cent of the children coöperate in this effort. This was a school project (14). This teacher earns 133 points, and according to the writer's judgment has done excellent work.

There is, of course, still much to be done, but if the teacher who succeeds Teacher C has similar tact, intelligence, and courage, the health education in this district will steadily advance.

Suggestions to superintendents and teachers as to the use of the scale. By the end of the first month of teaching, the teacher should be so familiar with her school, the children, and the neighborhood that she can make definite plans for the health work for the year. A careful study of the plan of measurement would suggest what might be done, and with this before her she could decide what she would do and if she did how her efforts might be rated.

Superintendents who wish to make a "drive" on health education will find it desirable to call all the teachers together in conference and make plans for the year. With proper leadership every teacher should be able to do at least passable work, and many might get excellent results. If the work attempted and done could be checked up once or twice during the year, so that each might know the other's difficulties and also what was accomplished with handicaps, the teacher would no doubt be greatly stimulated.

As a final suggestion the author would like to emphasize again what has been mentioned so frequently in previous pages — the need of enlisting tactfully, cautiously but persistently, the interest and coöperation of the parents and community if the best results are to be attained.

CLASS EXERCISES

1. Make a study of the health work of one or two rural schools. Judging according to the plan of measurement suggested in this chapter is the teacher doing poor, good, or excellent work?
2. Can you add to the list of items or activities suggested in this plan of measurement?
3. Figure out in detail two different sets of teacher achievements, each pair of which might be scored as poor, good, and excellent.
4. After studying the situation in some rural school make definite plans for a year showing just what you would expect to accomplish so as to have your work rated excellent.
5. Make specific plans for a training class in hygiene. See pp. 56-57.

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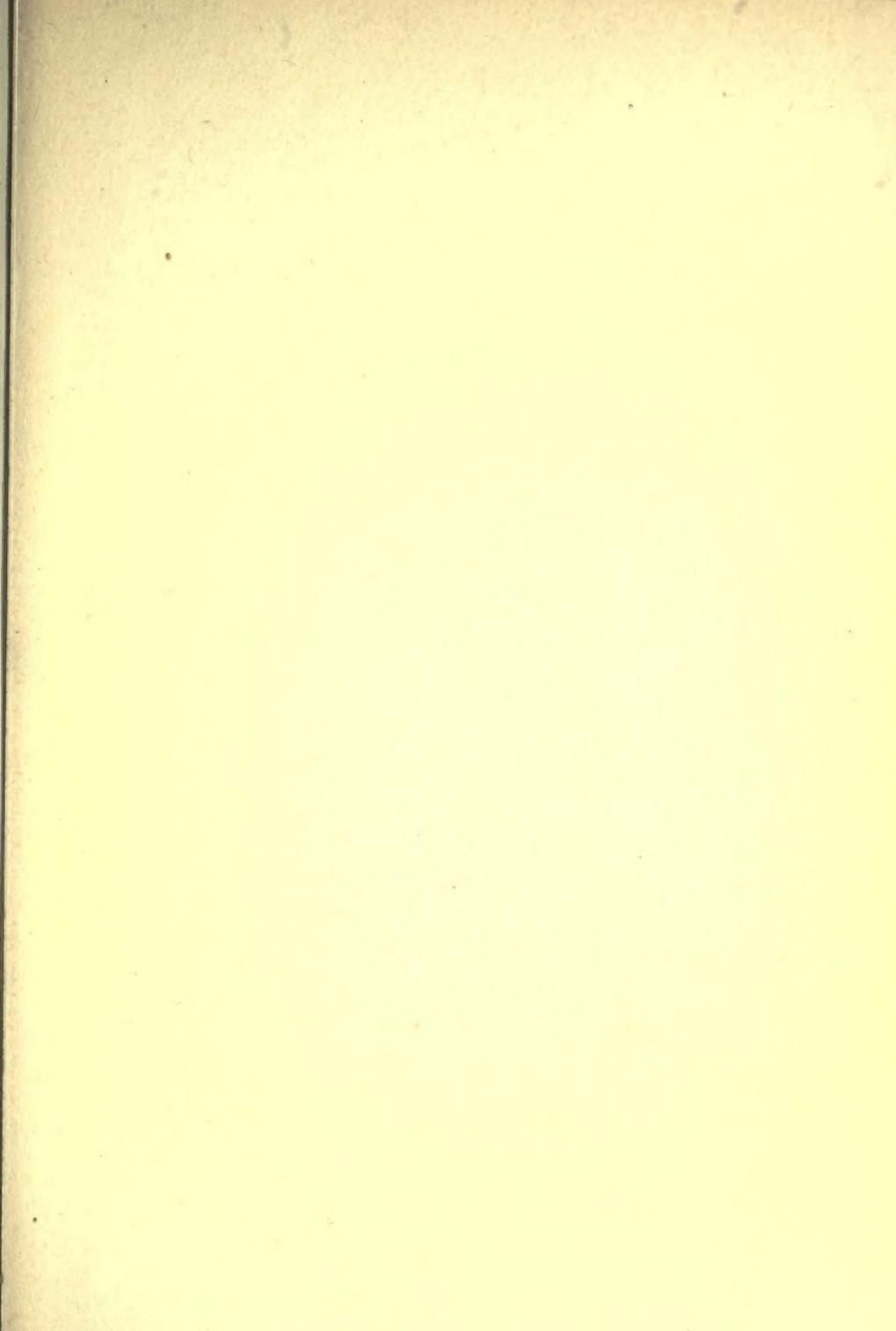
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